Fishery Management Report No. 96-2

Area Management Report for the Recreational Fisheries of Northern Cook Inlet, 1995

by

Craig Whitmore,

Dana Sweet,

and

Larry Bartlett

July 1996

Alaska Department of Fish and Game **Division of Sport Fish**

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used in Division of Sport Fish Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications without definition. All others must be defined in the text at first mention, as well as in the titles or footnotes of tables and in figures or figure captions.

Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
metric ton	mt
milliliter	ml
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
ounce	oz
pound	lb
quart	qt
yard	yd

Spell out acre and ton.

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
hour (spell out for 24-hour clock)	h
minute	min
second	s

Spell out year, month, and week.

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

All commonly accepted abbreviations.	e.g., Mr., Mrs., a.m., p.m., etc.
All commonly accepted professional titles.	e.g., Dr., Ph.D., R.N., etc.
and	&
at	@
Compass directions:	
east	E
north	N
south	S
west	W
Copyright	©
Corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
et alii (and other people)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.,
id est (that is)	i.e.,
latitude or longitude	lat. or long.
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
number (before a number)	# (e.g., #10)
pounds (after a number)	# (e.g., 10#)
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S. state and District of Columbia abbreviations	use two-letter abbreviations (e.g., AK, DC)

Mathematics, statistics, fisheries

alternate hypothesis	H_A
base of natural logarithm	e
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	F, t, χ^2, etc.
confidence interval	C.I.
correlation coefficient	R (multiple)
correlation coefficient	r (simple)
covariance	cov
degree (angular or temperature)	°
degrees of freedom	df
divided by	÷ or / (in equations)
equals	=
expected value	E
fork length	FL
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
mideye-to-fork	MEF
minute (angular)	'
multiplied by	x
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
standard length	SL
total length	TL
variance	Var

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Craig Whitmore,
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Larry Bartlett
Division of Sport Fish, Palmer

Alaska Department of Fish and Game
Division of Sport Fish , Research and Technical Services
333 Raspberry Road, Anchorage, Alaska, 99518-1599

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The Fishery Management Reports series was established in 1989 for the publication of an overview of Division of Sport Fish management activities and goals in a specific geographic area. Fishery Management Reports are intended for fishery and other technical professionals, as well as lay persons. Distribution is to state and local publication distribution centers, libraries and individuals and, on request, to other libraries, agencies, and individuals. This publication has undergone regional peer review.

Craig Whitmore, Dana Sweet, and Larry Bartlett
Alaska Department of Fish and Game, Division of Sport Fish
1800 Glenn Highway, Suite 4, Palmer, AK 99645-6736

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INTRODUCTION

This report is divided into two sections. Section I presents an introductory overview of the Northern Cook Inlet Management Area. Included in this section are a general geographic and organizational description of the management area; an inventory of the available fishery resources of the management area; an overview of the Alaska Board of Fisheries processes; a historical perspective of recreational angler effort, catch and harvest within management area waters; and an approximation of the economic value of the recreational fisheries of the management area. A general description of research and management activities being conducted and a summary of the major biological and social issues that presently occur in the Northern Cook Inlet Management Area are also presented. Section II provides a more detailed summary of the major fisheries that occur in the Northern Cook Inlet Management Area. Included in this section are a description and historical perspective of each fishery, the objective governing the management and descriptions of the recent performance, recent Board of Fisheries actions, any social or biological issues, any ongoing or recommended research or management activities and ongoing and planned access programs.

SECTION I: MANAGEMENT AREA OVERVIEW

MANAGEMENT AREA DESCRIPTION

The Northern Cook Inlet sport fish management area (NCIMA) includes all freshwater drainages and adjacent marine waters of Upper Cook Inlet between the West Foreland and the Eklutna River, excluding the upper Susitna River drainage above the Oshetna River confluence (Figure 1). The management area encompasses approximately 23,000 square miles and is dominated by the Susitna River drainage which originates in glaciers of the Alaska and Talkeetna mountain ranges and flows about 200 miles in a southerly direction before entering Cook Inlet near Anchorage. Virtually all sport fisheries in the NCIMA are relatively easy to access by road or jet-boat, with the exception of the remote West Cook Inlet Unit waters which are accessible only by boat or aircraft.

For the purposes of management and harvest reporting, the NCIMA is segregated into four major units (Figure 1):

1. Knik Arm Unit: This unit includes all waters of the Matanuska and Knik River drainages, the Little Susitna River drainage, and all waters draining into Knik Arm excluding those entering south and west of the Eklutna River; all adjacent marine waters of Cook Inlet; and the waters of the Nancy Lake Recreation Area.
2. Eastside Susitna Unit: This unit includes all drainages of the upper Susitna River above the Chulitna River to and including the Oshetna River drainage, all eastside drainages of the Chulitna River, and all eastside drainages of the Susitna River below its confluence with the Chulitna River to and including Willow and Deception creeks to the south. This area also includes eastside drainages of the Susitna River within a half mile of the Susitna River downstream of Willow Creek. This management unit has no marine waters.

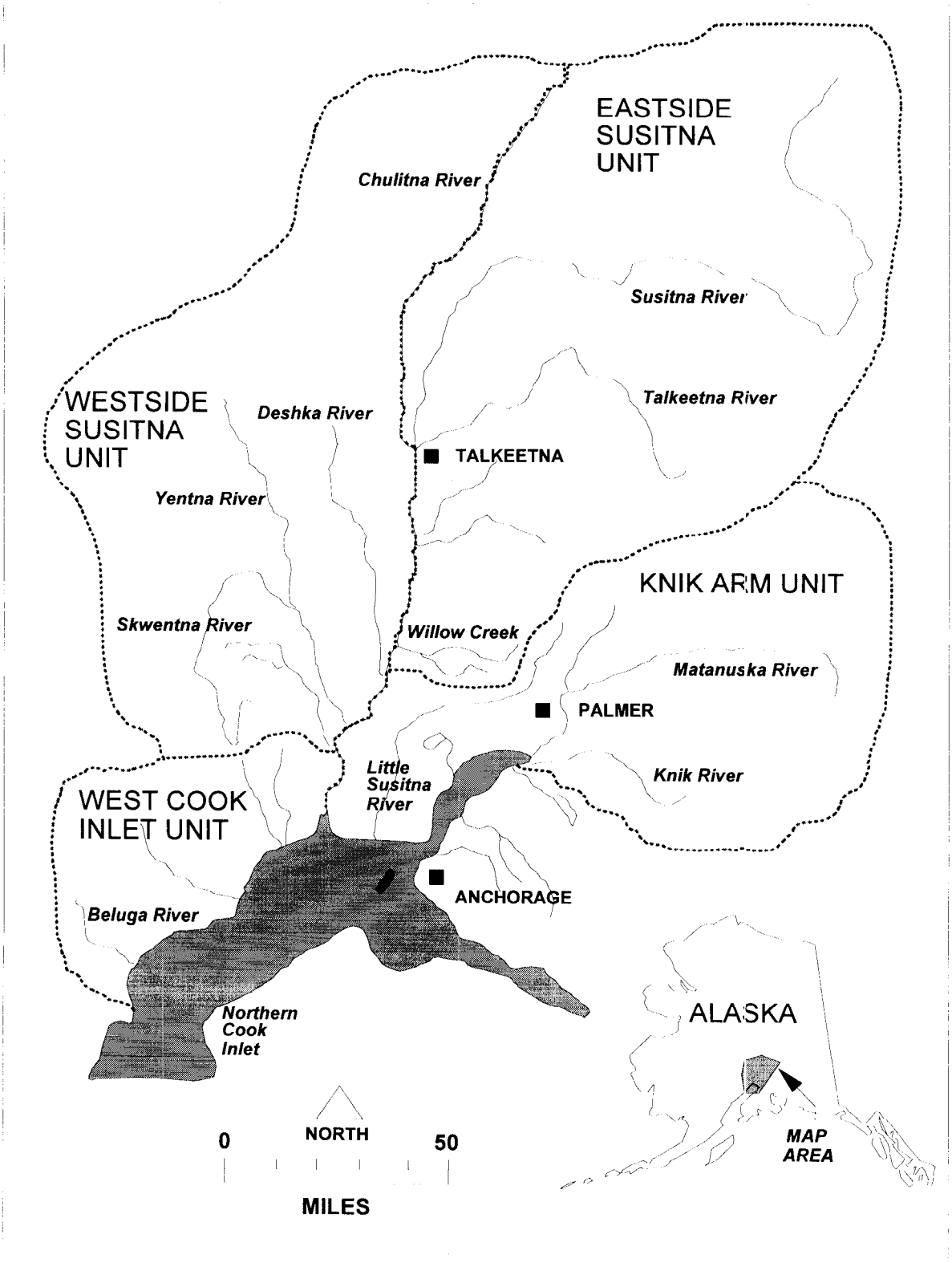

Figure 1.-Map of the Northern Cook Inlet sport fish management area.

3. Westside Susitna Unit: This unit includes all westside drainages of the Chulitna River, and all westside drainages of the Susitna River below its confluence with the Chulitna River. This management unit has no marine waters.
4. West Cook Inlet Unit: This unit includes all freshwater drainages entering Cook Inlet between the Susitna River and the West Foreland, and all adjacent marine waters of Cook Inlet.

The NCIMA is comprised of two complete and a portion of a third Statewide Harvest Survey (SWHS) reporting area (Howe et al. 1995). These areas include: (1) the Knik Arm Drainage Area reporting unit (Area K), the East-Side Susitna Drainage Area reporting unit (Area M), and the West-Side Cook Inlet-West-Side Susitna Drainage Area reporting unit (Area N). The West-Side Cook Inlet-West-Side Susitna Drainage Area (Howe et al. 1995) includes fresh and marine waters between the West Foreland and Cape Douglas, an area outside of the NCIMA; Area N fisheries outside of the NCIMA are not included in this report.

In terms of political geography, the management area is very similar to the boundaries of the Matanuska-Susitna Borough. About 50% of the state's population resides within or immediately adjacent to the management area. Major communities within the management area include Wasilla, Palmer, Talkeetna, Willow, and Houston. Smaller communities that occur in the management area include Tyonek, Chickaloon, and Skwentna. The Municipality of Anchorage, Alaska's largest community, borders the management area. Although much of Alaska's population resides in or near the NCIMA, it is important to note that much of the management area is either sparsely populated or uninhabited because of a limited transportation system. The State of Alaska is the principal land manager in the NCIMA. Other significant land managers in the NCIMA include the Matanuska-Susitna (Mat-Su) Borough, various native corporations and villages, and the federal government.

Management and research functions for the NCIMA are conducted from the Alaska Department of Fish and Game (ADF&G) Palmer area office. The Division of Sport Fish staff stationed in Palmer include a permanent full-time Fisheries Biologist III Area Management Biologist (Craig Whitmore), a permanent full-time Fisheries Biologist III Area Research Biologist (Larry Peltz), a permanent full-time Fisheries Biologist II Assistant Area Management Biologist (Larry Bartlett), two permanent full-time Fisheries Biologist II Research Biologists (David Rutz and Robert Lafferty), and one permanent full-time clerical position Clerk-Typist III (Nancy Deslauriers), which is shared with the Division of Wildlife Conservation staff. These positions are assisted by 20 permanent-seasonal Fisheries Biologist and Fish and Wildlife Technician positions who act as crew leaders and staff for area research and management projects. Significant support is also provided to the area staff from the Sport Fish Division's Southcentral region Research and Technical Services (RTS) staff. A regional maintenance worker (James Whitt, Jr.) performs maintenance services for the Southcentral region from a shop located in Palmer.

FISHERIES RESOURCE INVENTORY

Sport anglers fishing NCIMA waters can target all five species of North American Pacific salmon (pink *Oncorhynchus gorbuscha*, coho *O. kisutch*, sockeye *O. nerka*, chum *O. keta*, and chinook *O. tshawytscha*) in both fresh and salt water. In addition, there are major fisheries for rainbow trout *O. mykiss*, Dolly Varden *Salvelinus malma*, Arctic char *Salvelinus alpinus*, and Arctic grayling *Thymallus arcticus*; as well as for lake trout *Salvelinus namaycush*, northern pike

Esox lucius, burbot *Lota lota*, whitefish *Coregonus* and *Prosopium*, landlocked salmon *Oncorhynchus*, and smelt Osmeridae.

ALASKA BOARD OF FISHERIES ACTIVITIES

The waters of the NCIMA fall within two regulatory areas: the Susitna/West Cook Inlet Regulatory Area and the Cook Inlet/Resurrection Bay Salt Water Regulatory Area. Regulations governing the sport fisheries of the Susitna/West Cook Inlet and the Cook Inlet/Resurrection Bay Salt Water Regulatory Areas are established in Chapters 61 and 58, respectively, of Title 5 of the Alaska Administrative Code.

The process of developing fishing regulations appropriate for fisheries in the NCIMA occurs within the established Alaska Board of Fisheries (BOF) process. Public input concerning regulation changes and allocation issues is provided for in this process through various means including submission of proposals, direct testimony to the BOF, and/or participation in local fish and game advisory committees. Advisory committees have been established throughout Alaska to assist the Boards of Fisheries and Game in assessing fisheries and wildlife issues and proposed regulations. Most active committees meet at least once each year, usually in the fall prior to the BOF meetings. Staff from the Division of Sport Fish and other divisions are often invited to attend the committee meetings. In this way, advisory committee meetings allow for direct public interaction with staff involved with resource issues of local concern. Within the NCIMA there are four Fish and Game Advisory Committees: Denali, Matanuska, Tyonek and Mt. Yenlo. Staff also have significant interaction with the Anchorage Advisory Committee which is outside, but bordering, the NCIMA. Under the current operating schedule the BOF meets on a 3-year cycle. Proposals regarding the NCIMA were addressed in November of 1992. Appendix F provides a summary of BOF regulatory changes made during this meeting. The next BOF meeting for this area is scheduled for February 1996.

EXISTING MANAGEMENT PLANS

Upper Cook Inlet fisheries have been the focus of intensive allocation battles for many years. These conflicts have lead the BOF to establish numerous management plans and policies to guide the area's fisheries. These plans attempt to assure sustained yield of the area's fish resources, as well as establishing allocations and management actions and guidelines.

There are seven management plans and policies which the BOF has adopted that impact NCIMA fisheries. These are:

1. Upper Cook Inlet Salmon Management Plan (5 AAC 21.363),
2. Northern District Chinook Salmon Management Plan (5 AAC 21.366),
3. Fish Creek Sockeye Salmon Management Plan (5 AAC 21.364),
4. Big River Sockeye Salmon Management Plan (5 AAC 21.368),
5. Little Susitna River Coho Salmon Management Plan (5 AAC 61.060),
6. Cook Inlet and Copper River Basin Rainbow/Steelhead Trout Management Policy (ADF&G 1986), and
7. Upper Cook Inlet Subsistence Salmon Management Plan (5 AAC 01.592).

The Upper Cook Inlet Salmon Management Plan provides the department direction towards managing the sport and commercial harvests of Cook Inlet salmon. This plan, which was adopted by the BOF as a formal regulation in 1981 and amended in 1992 can be broken into the following allocative components:

1. Provide for a subsistence priority;
2. Manage the Northern District chinook salmon, early Russian River sockeye salmon, and early Kenai River chinook salmon returns, which normally move through upper Cook Inlet prior to June 30, primarily for recreational use;
3. Manage those stocks moving through upper Cook Inlet between July 1 and August 15 primarily for commercial uses;
4. After August 15, manage stocks moving to Kenai Peninsula drainages primarily for recreational use;
5. Manage stocks other than those spawning in Kenai Peninsula drainages primarily for commercial uses; and
6. Minimize the incidental commercial harvest of Northern District coho salmon, late Kenai River chinook salmon, and early Kenai River coho salmon.

This plan states that chinook salmon bound for the NCIMA will be managed primarily for recreational uses because these fish stocks move through upper Cook Inlet prior to June 30. From July 1 to August 15, NCIMA salmon are managed primarily for commercial uses as they pass through upper Cook Inlet. After August 15, the department is to minimize the incidental commercial harvest of Northern District coho salmon stocks. Action taken during the 1992 BOF meeting directed towards accomplishing this goal established that Northern District set gillnet periods after August 15 would be limited to regularly scheduled periods. The BOF clarified that they did not want to see further expansion of the commercial harvest of coho salmon in the Northern District after August 15.

The Tyonek subsistence fishery (5 AAC 01.560) is an important component of the Upper Cook Inlet Salmon Management Plan. This fishery provides subsistence fishing opportunity primarily to residents of the village of Tyonek. Fish harvested in this fishery are bound for NCIMA. Specific fishing periods occur from May 15 through October 15. This fishery has been regulated by a 4,200 chinook salmon harvest quota since 1980.

The Northern District Chinook Salmon Management Plan was adopted in 1985 by the BOF. This plan provides for 6-hour commercial fishing periods, with gillnets 35 fathoms in length with a maximum mesh size of 6 inches, on Mondays between June 1 and June 24. The season is closed prior to June 24 if 12,500 chinook salmon are harvested.

The Fish Creek Sockeye Salmon Management Plan (5 AAC 21.364) was adopted by the BOF in 1986. This plan governs the harvest of Fish Creek sockeye salmon in excess of the system's 50,000 escapement goal. This plan provides for a terminal set gillnet fishery in Knik Arm near the mouth of Fish Creek through July 29. Beginning July 23, provided a return of 50,000 sockeye salmon is reached, a personal use dip net fishery is initiated in Fish Creek (5 AAC 77.545). This fishery closes the second Friday in August or earlier if interception of coho salmon becomes a conservation concern.

The Big River Sockeye Salmon Management Plan authorizes a harvest of Big River salmon by set gillnets in the Kustatan Subdistrict of the Central District. Sockeye salmon are the targeted species. This fishery extends from May 25 through June 24, but is subject to emergency closure when the incidental harvest of chinook salmon exceeds 1,000 fish.

The Little Susitna River Coho Salmon Management Plan (5 AAC 61.060) was adopted by the BOF in 1990 and modified in 1992. This plan provides the department management guidelines to ensure that:

1. A spawning escapement of 7,500 nonhatchery coho salmon into the Little Susitna River upstream of the George Parks Highway is achieved, and
2. The harvest of hatchery-produced coho salmon returning to the Little Susitna River is maximized.

The Cook Inlet and Copper River Basin Rainbow/Steelhead Trout Management Policy for Cook Inlet waters was adopted by the BOF in 1986. This policy provides future Fisheries Boards, ADF&G managers, and the sport fishing public with the following:

1. Management policies and implementation directives for Cook Inlet rainbow and steelhead trout, and
2. A systematic approach to developing sport fishing regulations that includes a process for rational selection of waters for such special management as catch-and-release, trophy areas and high yield fisheries.

The Upper Cook Inlet Subsistence Salmon Management Plan (5 AAC 01.592) was created by the BOF in December of 1990 as a result of the Alaska Supreme Court's decision to eliminate the rural residency requirement for participation in subsistence fisheries. During 1991 only 5 days of subsistence fishing were allowed, however, during the 1992 season 35 days of fishing were allowed (Fox and Ruesch 1992). In December of 1992 the BOF found that most of Cook Inlet was a nonsubsistence zone and repealed the Upper Cook Inlet Subsistence Management Plan. A court ruling in November of 1993 found this action by the BOF to be unconstitutional. The Upper Cook Inlet Subsistence Management Plan was again in effect during the 1994 season. Prior to the 1995 season court action again threatened the closure of the subsistence fishery. The BOF then took action to allow a similar fishery as a personnel use fishery. Specific fishing periods occur from mid-May through September.

Fisheries for other species not covered by the above management plans or policies are managed to assure sustained yield of the targeted fish stock while assuring for the continued, and where possible, the expanded opportunity to participate in the fishery.

RECREATIONAL ANGLER EFFORT

Beginning in 1977, recreational angler effort in the NCIMA has been estimated using a mail survey (Mills 1979-1994, Howe et al. 1995). This survey estimates the number of angler-days of sport fishing effort expended by recreational anglers fishing Alaskan waters, as well as the harvest of important sport species. The survey is designed to provide estimates of effort and harvest on a site-by-site basis and, unfortunately, is not designed to provide estimates of effort directed towards a single species. Beginning in 1990, the survey was modified to include estimation of catch (release plus harvest) on a site-by-site basis. Additionally, onsite creel

surveys have been selectively used in conjunction with the mail survey for fisheries that require more detailed information or inseason management. The following summary of recreational angler effort in the NCIMA is based on the mail survey data.

From 1977 through 1994, an average of 294,667 angler-days have been spent by anglers fishing NCIMA waters (Table 1). Historically, the effort expended by anglers fishing NCIMA waters has represented an average of 15% of the total statewide and 21% of the Southcentral region angling effort. Angler-effort generally increased annually from 1977 through 1988 (Figure 2), when 392,875 angler-days were documented. Since 1988, effort has ranged from 346,590 angler-days (1990) to a record high in 1992 of 401,780 angler-days. The Kenai Peninsula sport fish management area is currently the only management area in Alaska which receives greater use by recreational anglers (Howe et al. 1995).

During 1994 anglers spent an estimated 373,455 angler-days fishing NCIMA waters. This was a slight increase in effort from 1993 and was approximately 26% above the historical average. The effort in 1994 represented 14% and 19% of the total statewide and Southcentral region angling effort, respectively (Table 1).

Forty-two percent of the total effort from the NCIMA has historically occurred in the Knik Arm Management Unit (Table 1). From 1977 through 1994, these waters supported an average of 123,416 angler-days of fishing effort. A record number of angler-days (183,029) were expended during 1988. Nearly all of the effort over this period was expended in fresh water (Table 2). The Little Susitna River is the most heavily fished stream in the Knik Arm Management Unit, averaging about 36,466 angler-days of effort annually (Table 2, Figure 3). Other major fisheries occur in the many stocked lakes in the basin (notably in Big, Finger and Kepler Complex lakes) and at various road accessible streams including the Knik River and its tributaries, the Eklutna Power Plant tailrace, Big Lake drainage streams, and Cottonwood and Wasilla creeks (Table 2, Figure 3). A limited saltwater fishery also occurs off the mouth of Fish Creek in Knik Arm (Table 2).

Anglers fishing the Eastside Susitna River Unit from 1977 through 1994 expended an average of 91,790 angler-days (Table 1). This expenditure of effort has represented an average of 32% of the total sport effort from all NCIMA waters from 1977 through 1994. A total of 114,533 angler days occurred during 1994, a decrease from the historical high recorded in 1992. Major fisheries occur in Willow, Montana, Sheep, and Little Willow creeks, and the Talkeetna River and its various tributaries (Table 3, Figure 4).

Anglers fishing the Westside Susitna Management Unit from 1977 through 1994 expended an average of 79,461 angler-days (Table 1). This expenditure of effort has represented an average of 26% of the total effort from all NCIMA waters from 1977 through 1994. A record number of angler-days (106,724) occurred during 1993. Major fisheries occur in the Deshka River, Lake and Alexander creeks and the Yentna River and its tributaries (Table 4, Figure 5). Other fisheries occur in various remote lakes in the area (notably in Judd, Shell, Whiskey, and Hewitt lakes) (Table 4, Figure 5).

Table 1.-Number of angler-days of sport fishing effort expended by recreational anglers fishing Northern Cook Inlet Management Area waters, 1977-1994.

Year	Knik Arm		East Susitna R.		West UCI & West Susitna R.		NCIMA	Alaska	% by	Region II	% by
	Effort	% NCIMA	Effort	% NCIMA	Effort[a]	% NCIMA	Total	Total	NCIMA	Total	NCIMA
1977	81,949	48	56,651	33	31,946	18	170,546	1,198,486	14	828,351	20
1978	75,540	37	86,010	42	38,771	19	200,321	1,285,063	15	913,417	21
1979	78,411	37	78,222	37	50,374	24	207,007	1,364,739	15	1,014,018	20
1980	102,530	42	91,304	37	48,125	19	241,959	1,488,962	16	1,072,384	22
1981	105,052	51	59,854	29	37,335	18	202,241	1,420,172	14	1,016,731	19
1982	91,713	40	80,745	359	52,222	23	224,680	1,623,090	13	1,131,358	19
1983	138,389	50	67,471	24	68,657	25	274,517	1,732,528	15	1,212,680	22
1984	130,727	46	81,758	29	67,102	24	279,587	1,866,837	15	1,341,658	20
1985	122,626	44	67,764	24	87,097	31	277,487	1,943,069	14	1,406,419	19
1986	131,546	41	92,289	28	96,054	30	319,889	2,071,412	15	1,518,712	21
1987	140,167	44	77,817	24	95,042	30	313,026	2,152,886	14	1,556,050	20
1988	183,029	46	107,977	27	101,869	25	392,875	2,311,291	17	1,679,939	23
1989	146,912	42	96,864	27	106,305	30	350,081	2,264,079	15	1,583,381	22
1990	142,884	41	101,917	29	101,789	29	346,590	2,453,284	14	1,745,110	19
1991	146,605	39	113,178	30	109,863	29	369,646	2,456,328	15	1,782,055	20
1992	141,825	35	149,484	37	106,916	26	398,225	2,540,374	15	1,889,930	21
1993	118,214	32	128,382	35	115,283	31	361,879	2,559,408	14	1,867,233	19
1994	143,372	38	114,533	30	115,550	30	373,455	2,719,911	13	1,966,985	19
MEAN	123,416	42	91,790	31	79,461	27	294,667	1,969,551	15	1,418,134	21

[a] 1977-1992 data include saltwater effort from outside the NCIMA as reported in the SWHS.

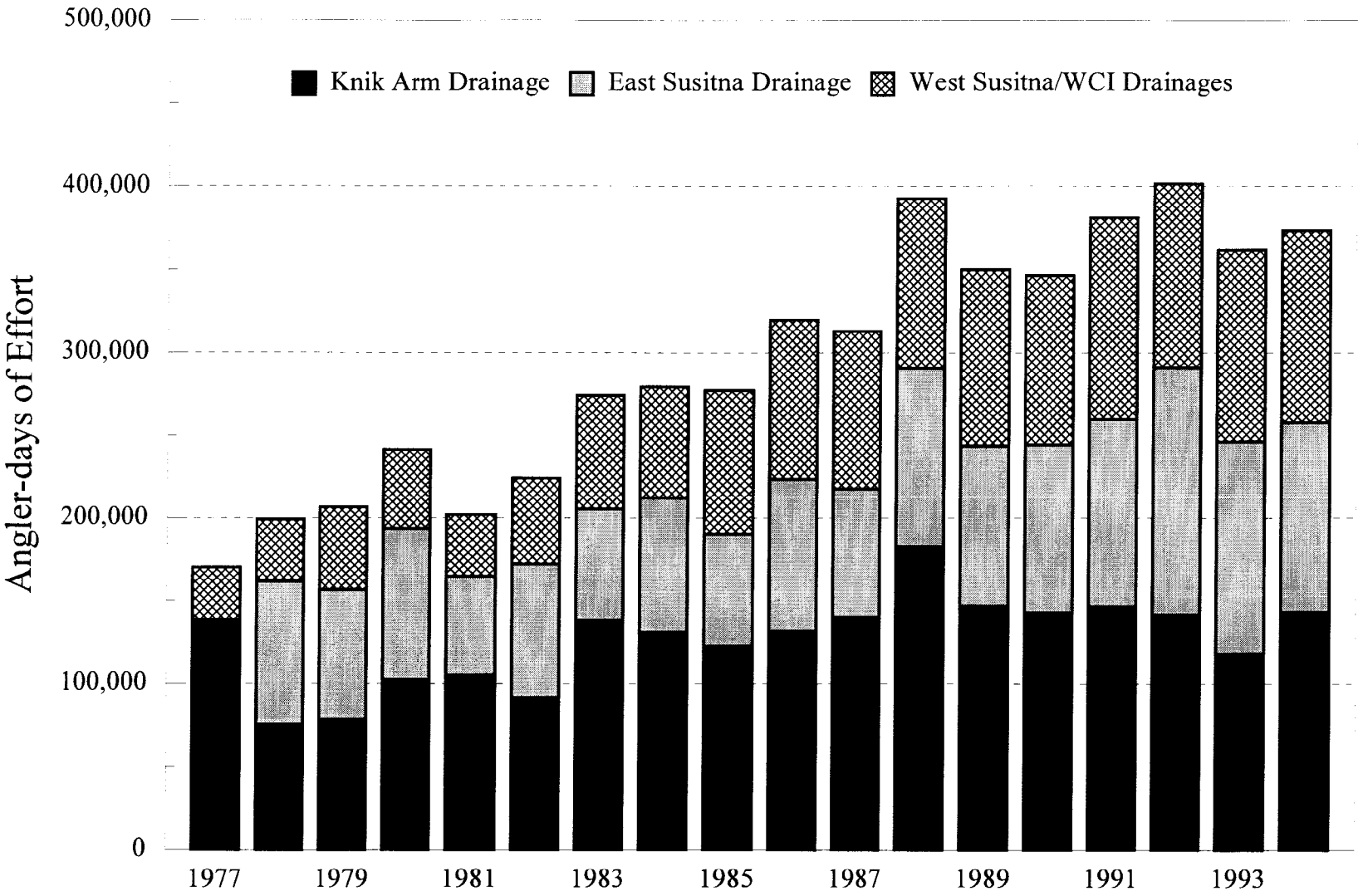

Figure 2.-Angler-days of sport fishing effort expended by recreational anglers fishing Northern Cook Inlet Management Area waters, 1977-1994.

Table 2.-Angler-days of sport fishing effort for the Knik Arm drainage by fishery, 1977-1994.

Year	Marine	Little Susitna	Knik River[a]	Eklutna Tailrace	Wasilla Creek	Cottonwood Creek	Big Lake[b]	Finger Lake	Kepler Lk Complex	Big Lake	Nancy Lk Complex	Other Lakes[c]	Other Streams	Total
1977		11,063			2,805			14,864	7,962	11,869	7,259	26,127		81,949
1978		12,127			3,446			11,502	5,730	9,865	7,647	25,223		75,540
1979		21,301			4,024	5,345		4,433	5,439	8,300	7,011	22,558		78,411
1980		22,420			5,726	9,268		6,483	8,597	12,195	9,153	28,688		102,530
1981		26,162	4,904		4,019	8,663		5,267	8,227	14,568	8,488	24,754		105,052
1982		24,020	6,653		6,261	5,186		3,514	6,943	15,371	8,615	15,150		91,713
1983	17,127	35,477	9,183		3,239	5,944		8,512	9,149	15,989	10,907	19,571	3,291	138,389
1984	4,316	48,517	9,369	3,413	3,547	7,144		6,843	9,770	12,916	7,194	15,892	1,806	130,727
1985	692	41,643	8,970	2,995	3,115	4,560	903	4,259	9,226	16,299	5,960	22,243	1,761	122,626
1986	983	45,770	13,015	8,549	3,387	5,653	2,641	5,589	9,544	14,559	6,520	13,147	2,249	131,606
1987	1,974	35,659	6,990	11,663	2,173	2,934	2,898	10,830	14,379	17,693	15,125	16,187	1,662	140,167
1988	1,239	49,731	23,229	13,188	2,228	4,056	3,110	8,240	18,245	10,077	12,099	35,159	2,428	183,029
1989	2,352	54,798	11,141	10,342	2,406	3,069	4,204	4,840	12,821	12,748	8,349	19,024	818	146,912
1990	2,494	40,159	17,878	7,618	2,679	3,056	3,936	6,737	13,644	11,798	9,973	19,949	2,963	142,884
1991	3,147	50,838	13,736	5,892	2,893	1,623	3,693	5,998	11,337	13,759	10,239	20,043	3,407	146,605
1992	1,540	49,304	8,856	4,279	1,110	1,974	4,534	5,506	15,556	11,545	12,299	24,723	599	141,825
1993	2,116	42,249	6,824	4,523	1,774	3,077	2,976	7,843	7,461	8,446	9,393	20,606	926	118,214
1994	1,244	45,149	9,658	8,974	2,226	3,230	3,496	9,434	11,832	9,987	10,197	25,063	2,882	143,372
Mean	3,269	36,466	10,743	7,403	3,170	4,674	3,239	7,261	10,326	12,666	9,246	21,895	2,066	123,420

[a] Knik River and tributaries including Jim Creek.

[b] Big Lake drainage streams.

[c] Includes effort for lakes and streams, 1977-1982.

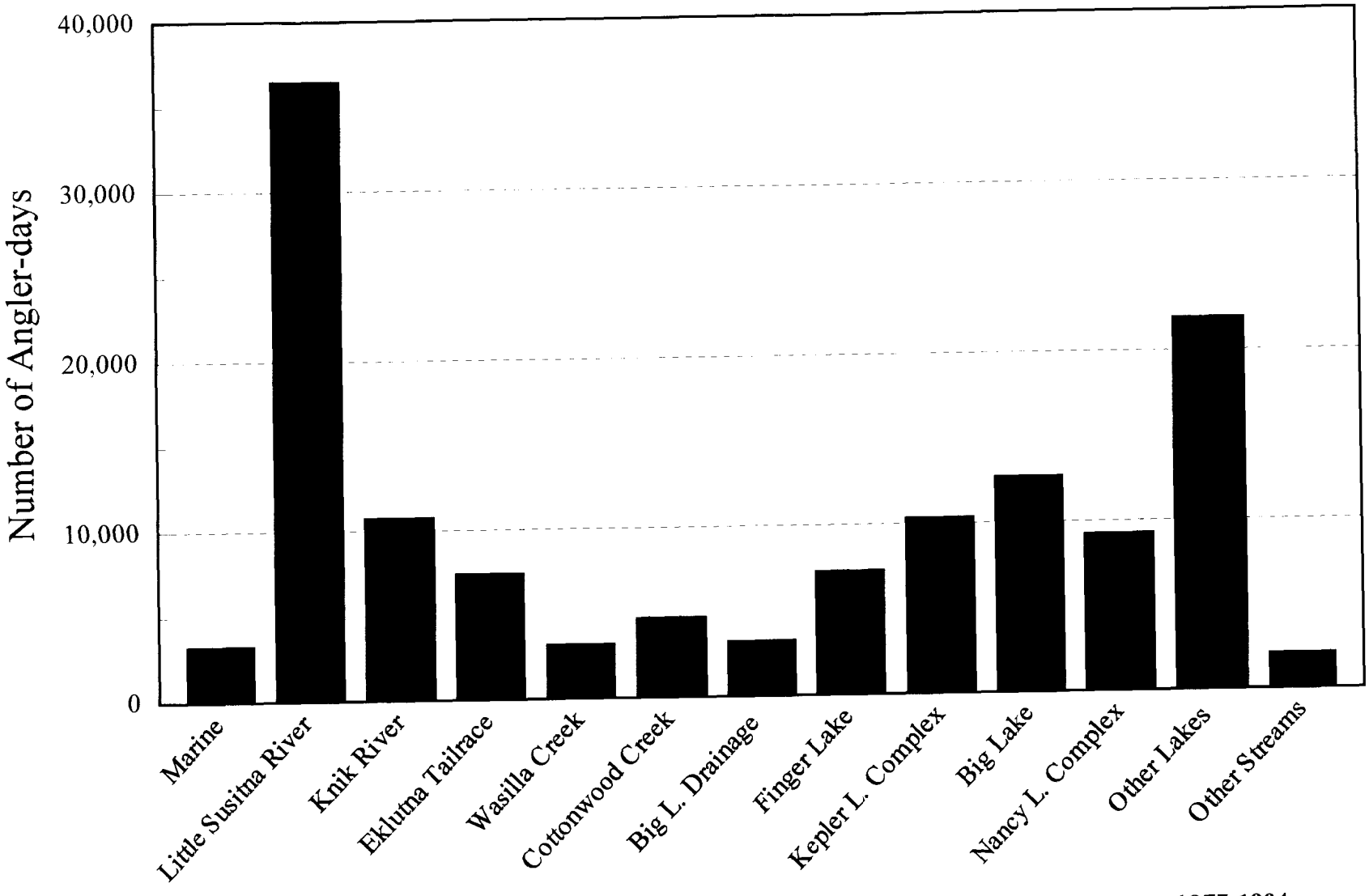

Figure 3.-Mean number of angler-days per year of sport fishing effort expended in Knik Arm waters, 1977-1994.

Table 3.-Angler-days of sport fishing effort for the eastside Susitna River drainage by fishery, 1977-1994.

Year	Willow Creek	Little Willow	Kashwitna River	Caswell Creek	Sheep Creek	Goose Creek	Montana Creek	Birch Creek	Sunshine Creek	Talkeetna River[a]	Other Streams	Lakes[b]	Total
1977	14,024	4,583			8,112		14,268			3,163		12,501	56,651
1978	22,682	5,687			11,869		25,762			5,040		14,970	86,010
1979	18,911	5,171		3,710	6,728		22,621		3,317	5,125		12,639	78,222
1980	29,011	8,190	4,963	8,041			19,287		5,208	4,388		12,216	91,304
1981	14,060	3,845		3,860	6,936		16,657		3,062	3,584		7,850	59,854
1982	19,704	5,579		5,101	9,093		23,645		3,787	3,856		9,980	80,745
1983	13,405	2,791	1,344	5,048	6,237		17,109		3,429	7,564	5,460	5,084	67,471
1984	21,649	5,872	2,995	4,952	6,106	1,305	19,239		3,229	9,252	4,417	2,742	81,758
1985	16,282	5,705		5,289	2,844		20,028		4,144	7,213	4,162	2,097	67,764
1986	10,733	4,490	2,908	4,362	10,091	1,993	20,268	2,010	8,124	8,638	10,566	8,106	92,289
1987	13,583	5,850	2,717	3,332	9,019	1,865	13,745	2,046	3,912	17,096	2,101	2,551	77,817
1988	27,758	10,768	1,454	4,529	18,699	2,947	16,498	2,074	4,129	12,733	3,648	2,740	107,977
1989	23,811	5,285	6,320	4,029	13,010	3,058	16,179	767	4,592	15,218	1,907	2,688	96,864
1990	32,200	6,505	2,313	6,103	11,392	3,714	11,284		4,485	18,299	3,287	2,335	101,917
1991	32,520	7,792	1,981	7,816	14,872	2,811	10,745	1,056	5,788	18,466	6,172	3,159	113,178
1992	50,958	9,240	2,177	6,391	17,509	4,908	18,437	1,366	4,833	21,478	6,347	5,840	149,484
1993	41,218	6,422	1,600	5,033	12,636	3,423	21,615	655	4,094	22,580	5,161	3,945	128,382
1994	34,362	6,744	1,957	5,842	11,526	3,300	16,220	1,092	4,265	18,642	6,134	4,449	114,533
Mean	24,271	6,140	2,524	5,023	10,262	2,932	17,978	1,383	4,400	11,241	4,947	6,438	91,790

[a] Talkeetna River and tributaries including Clear Creek.

[b] Includes effort for lakes and streams, 1977-1982.

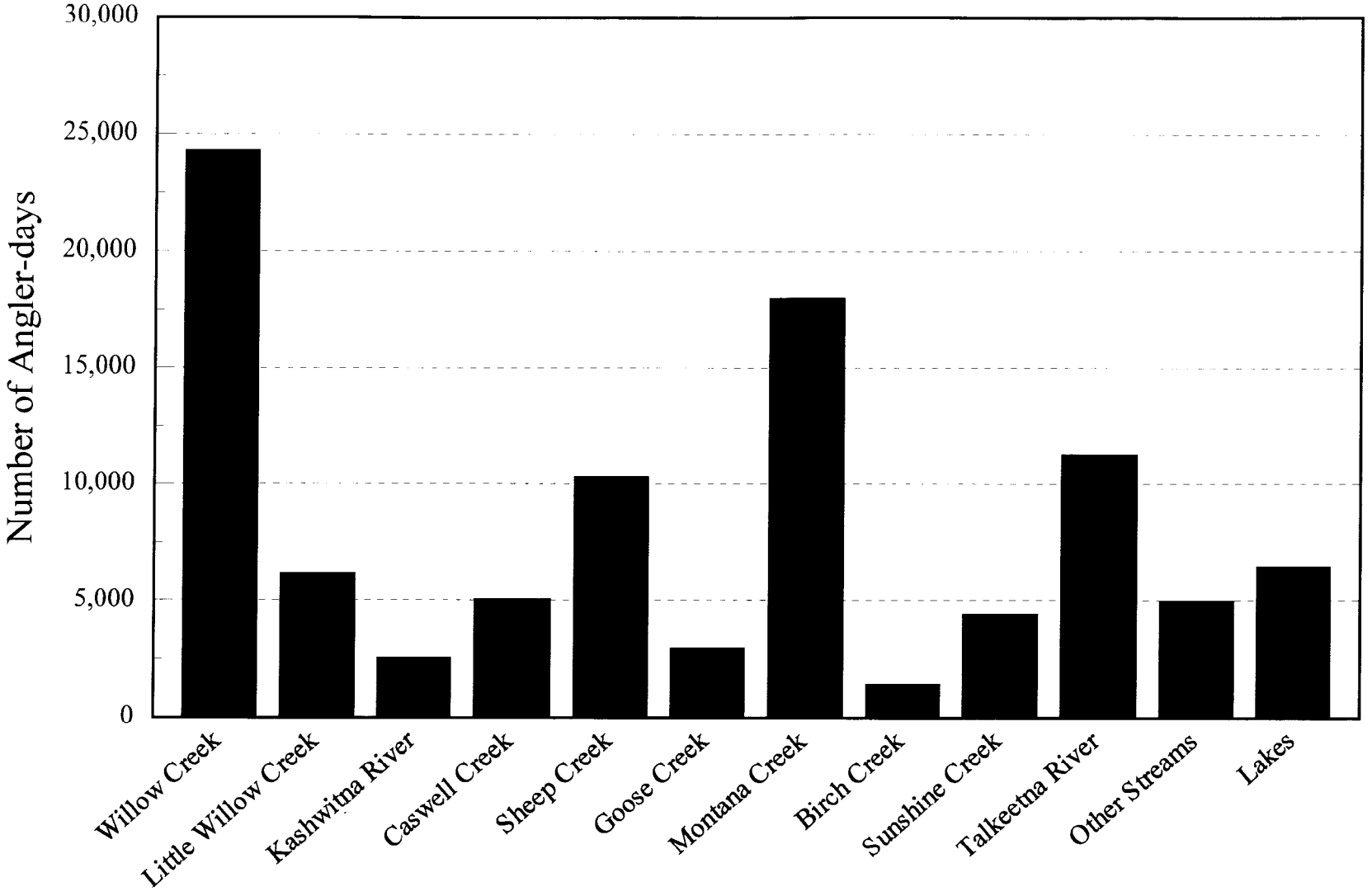

Figure 4.-Mean number of angler-days per year of sport fishing effort expended in the eastside Susitna River drainage, 1977-1994.

Table 4.-Angler-days of sport fishing effort for the westside Susitna River drainage by fishery, 1977-1994.

Year	Alexander Creek	Deshka River	Rabideux Creek	Moose Creek	Yentna River	Peters Creek	Lake Creek	Fish Creek[a]	Talachulitna River	Judd Lake	Shell Lake	Whiskey Lake	Hewitt Lake	Other Streams[b]	Other Lakes[b]	Total
1977	5,991	3,852					6,946		1,342	317	566	287	436	7,269	2,205	29,211
1978	6,914	9,111					8,767		732	151	302	129	172	6,011	3,420	36,509
1979	8,284	13,236					13,881		2,185	519	263	189	613	7,577	1,615	48,362
1980	6,812	19,364					8,325		2,542	814	414	29	471	4,998	2,999	46,768
1981	6,892	13,248					6,471		1,378					4,963	2,120	35,072
1982	10,748	18,391					8,649		1,911		444	171		7,012	3,412	51,096
1983	9,425	23,174					14,749		4,566	155	913			6,284	4,653	63,919
1984	7,261	20,561				786	14,739		3,848	1,255				9,652	3,161	61,263
1985	12,884	29,322					14,323		1,682					13,159	5,722	77,092
1986	19,113	29,739		1,193			15,626	3,838	2,186	963				13,753	1,325	87,736
1987	13,220	30,008					16,842	6,918	3,242	2,698				9,571	1,949	84,448
1988	19,591	32,160				2,001	16,007	5,784	8,040	588				8,047	3,121	95,339
1989	14,651	39,432	550	345	656	914	14,061	8,035	8,698	400				5,565	3,001	96,308
1990	19,863	32,082	1,024		849	1,318	17,914	4,857	5,184					5,430	3,914	92,435
1991	26,235	38,011	459		1,003	2,466	14,726	3,820	6,589	544				6,560	3,659	104,072
1992	18,085	37,056	992		1,985	2,198	16,869	3,873	5,153				800	9,586	4,899	101,496
1993	21,660	30,643			2,110	1,263	26,113	6,454	5,613					10,587	2,281	106,724
1994	25,608	19,267			3,936	1,195	27,958	7,011	7,292					10,113	3,732	106,112
Mean	14,069	24,370	756	769	1,757	1,518	14,609	5,621	4,010	765	484	161	498	8,119	3,177	73,553

[a] Fish Lake drainage (Yentna River drainage).

[b] May include effort from West Cook Inlet drainage waters.

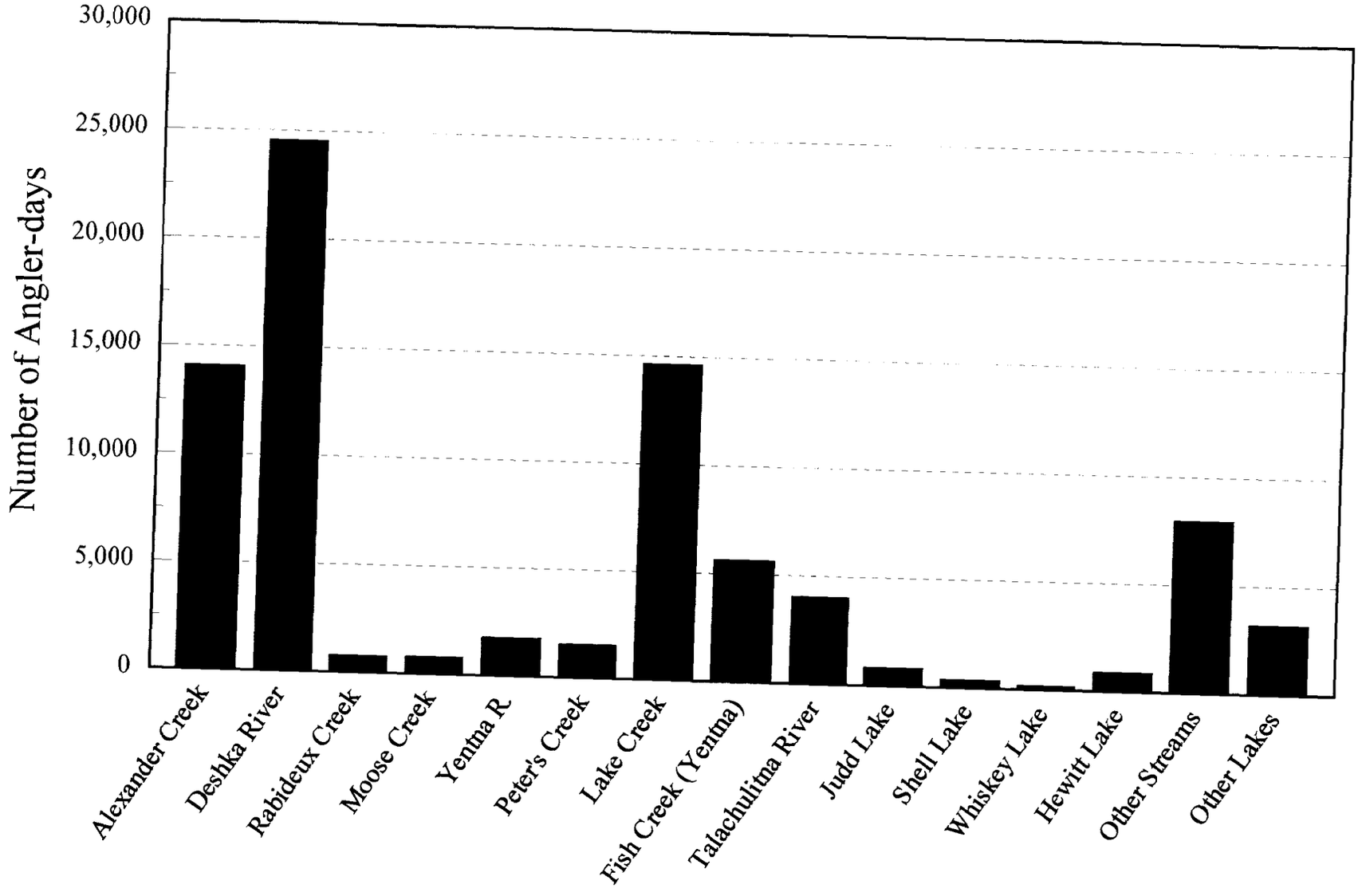

Figure 5.-Mean number of angler-days per year of sport fishing effort expended in the westside Susitna River drainage, 1977-1994.

From 1977 through 1994 anglers fishing West Cook Inlet Management Unit waters expended an average of 5,908 angler-days (Table 5). This expenditure of effort represents an average of 2% of the total effort from all NCIMA waters from 1977 through 1994. A record number of angler-days (10,594) occurred in 1987. All the annual effort has been expended in fresh water. Major fisheries include the Chuitna, Lewis, Theodore, and Beluga river drainages (Figure 6).

RECREATIONAL FISH HARVEST

From 1977 through 1994, an average of 209,732 fish were caught and kept (harvested) by anglers fishing NCIMA waters (Tables 6 and 7, Figures 7 and 8). Coho salmon, rainbow trout and chinook salmon accounted for 54% of this average harvest.

On average, fish from the Knik Management Unit accounted for 45% of fish caught and kept within the NCIMA (Table 6). The harvest was dominated by rainbow trout, coho salmon and landlocked salmon (Table 8). The Eastside Susitna and Westside Susitna units accounted for 28% and 24% of the NCIMA harvest during this time period, respectively, with chinook salmon, coho salmon, rainbow trout and Arctic grayling dominating harvests (Tables 9 and 10). The West Cook Inlet Unit accounted for only 2% of the NCIMA harvest, with chinook and coho salmon accounting for 62% of the WCI harvest (Table 11).

The 1977-1994 harvests by fishery of all species from the NCIMA are listed in Appendix A.

RECREATIONAL FISH CATCH AND RELEASE

Estimates of the number of fish caught and released by anglers fishing NCIMA waters became available for the first time during 1990 (Mills 1991-1994, Howe et al. 1995). From 1990 through 1994 an average of 539,583 fish were caught with approximately 60% released (Table 12).

The proportion and type of fish released by anglers varies within and among management units (Mills 1991-1994, Howe et al. 1995) (Tables 13 and 14). Arctic grayling, rainbow trout, northern pike, chum salmon and pink salmon were the most frequently released fish species during these years. In all units during each year the information was available, the number of fish caught and released was greater than the number of fish caught and harvested except during 1991 in the Knik Unit and in 1994 in the West Cook Inlet Unit (Figure 9).

OTHER USER GROUPS

Salmon returning to the NCIMA are also harvested by various commercial set and drift gillnet fisheries located throughout Upper Cook Inlet (Appendix B1). In nearly all cases harvests in the commercial fisheries are much larger than in NCIMA sport fisheries (Figure 10). The average commercial harvest from 1977 through 1994 was 5.6 million salmon by the various commercial fisheries of Upper Cook Inlet, whereas during this same period approximately 100,000 anadromous salmon were harvested on average by recreational anglers (Table 7 and Appendix B2). Chinook salmon are the exception: approximately equal numbers, on average, were taken in each fishery from 1977 through 1990. Since 1990, however, the yearly harvest of chinook salmon in the recreational harvest has been approximately double the commercial harvest (Table 7, Appendix B2).

It is generally believed that not all commercial fisheries in Upper Cook Inlet intercept the same proportion of NCIMA salmon stocks. For purposes of management, it has generally been

Table 5.-Angler-days of sport fishing effort for the West Cook Inlet drainage by fishery, 1977-1994.

Year	Chuitna River	Beluga River	Theodore River	Lewis River	Other	Total
1977	1,355		1,037	343		2,735
1978	1,185		905	172		2,262
1979	1,069		912	31		2,012
1980	614		700	43		1,357
1981	1,364		899			2,263
1982	751		375			1,126
1983	4,290		448			4,738
1984	2,342		3,497			5,839
1985	3,381		5,601	1,023		10,005
1986	3,532		4,786			8,318
1987	3,169		6,194	1,231		10,594
1988	1,637		4,056	837		6,530
1989	2,666	866	4,113	1,114	1,238	9,997
1990	4,443		3,626	1,285		9,354
1991	2,454		2,841	496		5,791
1992	2,817	512	2,091			5,420
1993	2,966		2,528	400	2,665	8,559
1994	2,236		3,492		3,710	9,438
Mean	2,348	689	2,672	634	2,538	5,908

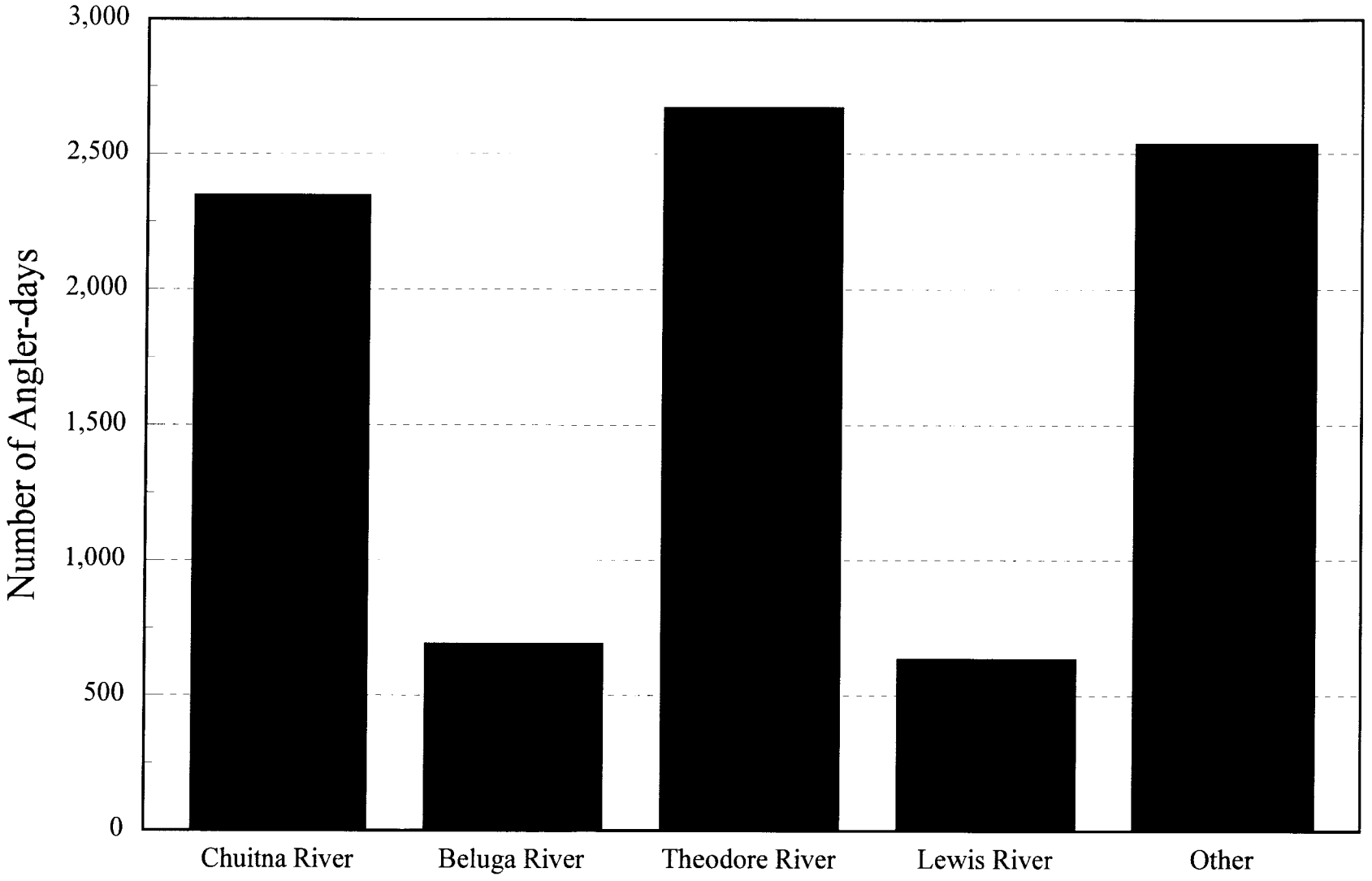

Figure 6.-Mean number of angler-days per year of sport fishing effort expended in the West Cook Inlet drainage, 1977-1994.

Table 6.-Northern Cook Inlet Management Area recreational harvest by management unit, 1977-1994.

Year	Knik Arm		East Susitna R.		West UCI & West Susitna R.		NCIMA	Alaska	% by	Region II	% by
	Harvest	% NCIMA	Harvest	% NCIMA	Harvest	% NCIMA	Total	Total	NCIMA	Total	NCIMA
1977	67,979	43.3	49,274	31.4	39,606	25.2	156,859	2,300,332	6.8	1,929,407	8.1
1978	66,420	31.5	96,469	45.7	48,287	22.9	211,176	2,399,472	8.8	1,992,212	10.6
1979	68,658	40.7	50,476	30.0	49,392	29.3	168,526	2,502,213	6.7	2,044,813	8.2
1980	102,015	41.2	93,271	37.7	52,272	21.1	247,558	2,627,312	9.4	2,118,543	11.7
1981	109,824	57.1	46,558	24.2	36,110	18.8	192,492	2,528,056	7.6	2,052,719	9.4
1982	82,976	43.6	58,998	31.0	48,199	25.3	190,173	2,828,706	6.7	2,222,354	8.6
1983	92,690	50.6	45,330	24.7	45,333	24.7	183,353	3,086,280	5.9	2,409,876	7.6
1984	94,974	45.3	62,071	29.6	52,823	25.2	209,868	3,115,966	6.7	2,517,185	8.3
1985	104,136	52.8	39,684	20.1	53,514	27.1	197,334	3,096,044	6.4	2,469,836	8.0
1986	90,264	39.7	73,083	32.2	63,768	28.1	227,115	3,163,433	7.2	2,609,304	8.7
1987	98,373	47.2	47,548	22.8	62,640	30.0	208,561	3,207,138	6.5	2,584,420	8.1
1988	156,784	53.8	62,693	21.5	71,772	24.6	291,249	3,483,306	8.4	2,841,033	10.3
1989	115,315	50.6	51,426	22.6	61,039	26.8	227,780	3,213,867	7.1	2,519,404	9.0
1990	90,035	46.9	44,360	23.1	57,509	30.0	191,904	3,033,301	6.3	2,428,172	7.9
1991	103,584	44.0	51,068	21.7	78,694	33.7	233,346	3,311,513	7.1	2,633,148	8.9
1992	88,267	38.9	76,569	33.8	61,920	27.3	226,756	3,234,048	7.0	2,675,940	8.5
1993	90,017	41.1	67,907	31.0	60,809	27.9	218,946	2,989,720	7.3	2,387,224	9.2
1994	87,547	45.2	51,991	26.8	54,199	28.0	193,737	3,349,821	5.8	2,689,718	7.2
MEAN	94,992	45.3	59,376	28.3	55,364	26.4	209,732	2,970,585	7.1	2,395,850	8.8

Table 7.-Northern Cook Inlet Management Area sport fish harvest by species, 1977-1994.

Year	Chinook Salmon	Coho Salmon	Sockeye Salmon	Pink Salmon	Chum Salmon	Landlocked Salmon	Rainbow Trout	Dolly Varden	Arctic Grayling	Lake Trout	Northern Burbot	Northern Pike	White Fish	Smelt	Other	Total
1977	4,674	17,206	7,962	30,136	2,062	27,429	32,270	13,365	15,799	3,231	1,024	132	0	0	1,569	156,859
1978	3,543	27,028	3,140	58,808	17,970	21,252	42,087	17,130	15,728	1,980	876	316	0	0	1,318	211,176
1979	7,964	24,076	6,193	13,925	5,599	12,144	47,924	17,718	27,949	1,789	1,172	382	0	0	1,691	168,526
1980	8,198	39,167	7,658	61,985	5,577	21,163	49,428	18,255	29,720	2,833	1,383	232	0	0	1,959	247,558
1981	8,602	23,870	8,369	9,627	4,897	24,533	63,592	20,310	24,506	2,375	518	125	0	0	1,168	192,492
1982	12,449	35,246	9,067	19,054	8,267	11,841	49,948	19,754	19,196	1,560	1,656	607	0	0	1,528	190,173
1983	14,860	15,637	21,423	5,686	6,033	23,854	46,184	20,299	21,227	3,532	2,305	944	0	0	1,369	183,353
1984	20,424	47,517	15,422	14,763	8,115	15,428	42,851	14,428	21,148	2,843	2,778	1,821	1,058	0	1,272	209,868
1985	21,904	34,082	9,678	4,018	3,053	15,345	63,319	18,539	18,485	622	1,855	1,404	2,477	2,240	313	197,334
1986	25,873	42,338	14,203	15,992	9,354	16,405	42,631	20,268	20,109	2,286	2,899	1,977	2,105	10,651	24	227,115
1987	25,906	48,187	13,530	4,634	6,304	15,032	39,909	16,385	16,405	2,046	5,140	2,464	2,861	9,265	493	208,561
1988	29,720	76,947	14,555	8,693	13,408	17,207	74,907	17,627	18,662	2,529	1,835	3,182	3,128	8,849	0	291,249
1989	35,792	61,203	14,238	5,191	9,097	11,804	54,952	12,715	12,238	2,397	978	3,120	1,716	2,324	15	227,780
1990	30,967	45,600	11,829	6,005	2,557	16,101	40,122	13,590	8,170	1,656	3,141	2,842	3,516	5,591	217	191,904
1991	33,965	70,939	11,713	3,517	3,240	15,924	52,544	13,973	10,114	1,527	981	6,640	2,057	6,132	80	233,346
1992	40,913	77,644	11,790	8,225	2,858	11,961	34,121	7,185	6,272	1,698	1,412	5,382	862	15,523	910	226,756
1993	49,287	79,858	13,085	4,792	2,512	14,567	27,864	5,674	5,166	775	1,655	5,721	878	6,596	302	218,733
1994	31,098	67,166	11,067	3,870	2,937	14,198	28,807	5,145	8,044	495	2,276	3,884	1,193	13,135	422	193,737
Mean	22,563	46,317	11,385	15,496	6,324	17,010	46,303	15,131	16,608	2,010	1,882	2,288	1,214	4,461	814	209,732
Percent of Mean	10.8	21.1	5.4	7.4	3.0	8.1	22.1	7.2	7.9	1.0	0.9	1.1	0.6	2.1	0.4	

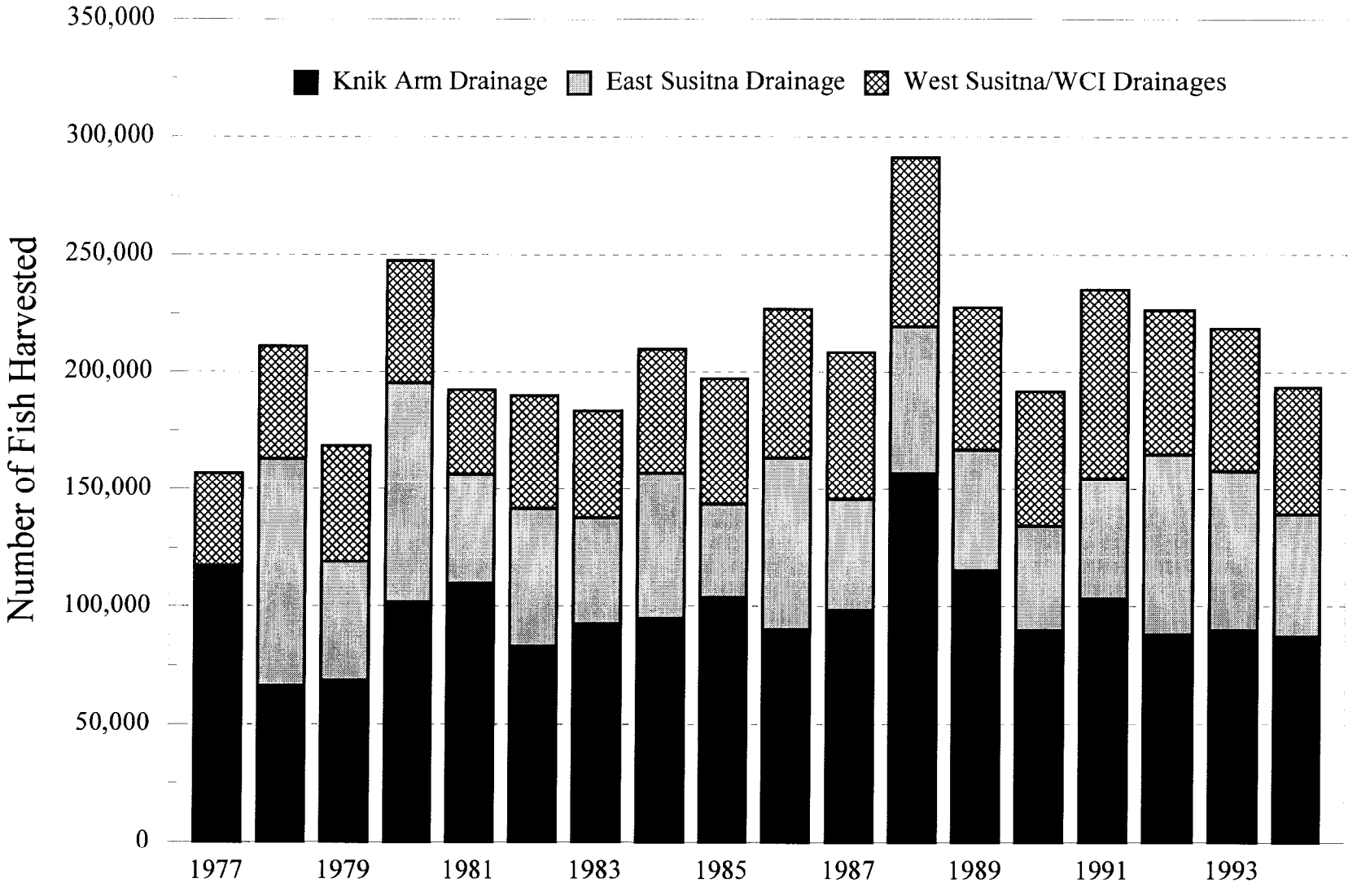

Figure 7.-Northern Cook Inlet Management Area recreational harvest, 1977-1994.

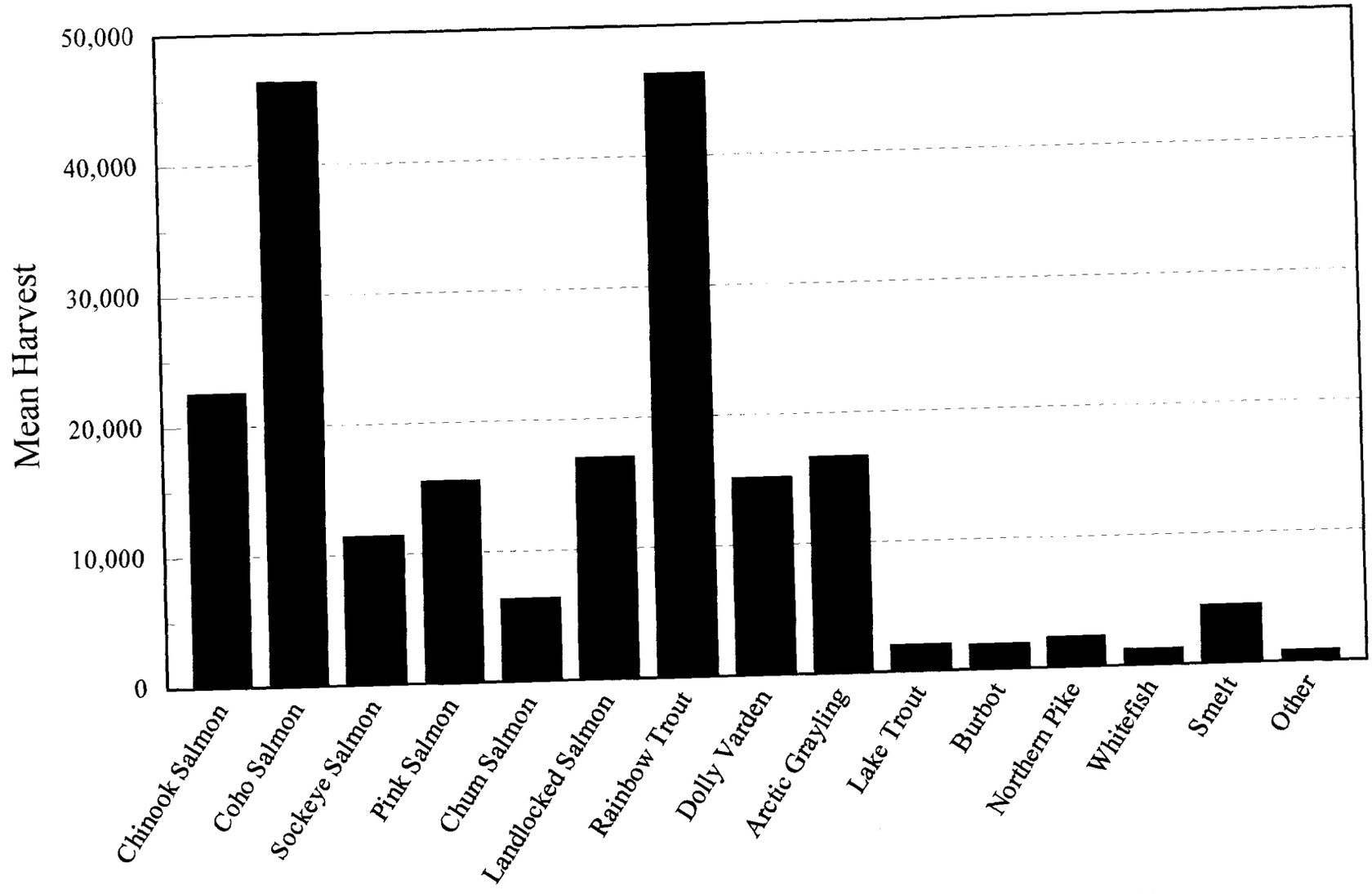

Figure 8.-Northern Cook Inlet Management Area mean recreational harvest by species, 1977-1994.

Table 8.-Knik Arm drainage sport fish harvest by species, 1977-1994.

Year	Rainbow Trout	Landlocked Salmon	Coho Salmon	Dolly Varden	Sockeye Salmon	Arctic Grayling	Chum Salmon	Pink Salmon	Chinook Salmon	Lake Trout	Smelt	White Fish	Northern Pike	Other	Burbot	Total
1977	18,615	26,917	4,366	7,541	1,576	3,916	250	1,661	207	2,260				380	290	67,979
1978	23,139	18,884	7,895	7,982	1,239	2,413	1,132	1,842	140	507				795	452	66,420
1979	24,843	11,853	7,139	8,582	3,616	8,371	654	818	800	1,254				437	291	68,658
1980	29,368	19,500	16,030	12,484	5,674	9,514	534	4,701	646	2,118				1,136	310	102,015
1981	41,749	24,255	10,484	14,475	6,080	7,396	431	834	1,466	1,791				776	87	109,824
1982	30,549	10,845	13,676	13,540	4,621	2,924	1,174	1,425	1,666	1,058				817	681	82,976
1983	26,421	22,805	6,139	13,391	14,297	4,425	643	1,009	1,255	1,279				429	597	92,690
1984	26,418	14,768	23,429	9,103	9,240	2,480	2,032	2,743	2,057	1,919				449	336	94,974
1985	46,431	14,461	14,339	13,336	5,612	4,768	514	787	1,889	277	560	587	156	209	210	104,136
1986	27,690	14,299	12,361	13,048	6,009	4,233	3,770	1,800	1,524	313	3,351	580	458	24	804	90,264
1987	24,663	14,887	25,787	11,425	8,785	3,893	2,574	886	2,476	906	0	380	924	462	325	98,373
1988	58,609	16,588	40,037	11,314	8,076	8,367	5,221	1,927	2,916	1,911	0	1,163	364	0	291	156,784
1989	44,518	11,268	23,846	8,161	9,040	5,429	4,477	1,321	4,341	835	0	844	863	0	372	115,315
1990	30,699	15,950	18,762	8,746	6,588	3,068	746	650	2,022	1,067	0	622	754	99	262	90,035
1991	39,636	15,910	22,186	9,138	4,968	2,846	1,099	926	2,277	512	0	900	2,709	0	477	103,584
1992	27,995	11,875	25,814	4,186	5,349	2,511	510	1,044	3,969	840	0	257	2,605	812	500	88,267
1993	21,565	13,829	35,763	3,686	5,926	1,343	885	230	3,602	201	0	227	2,102	176	482	90,017
1994	22,446	14,153	28,539	3,532	5,082	2,898	1,356	635	4,303	66	2,292	242	1,328	163	512	87,547
Mean	31,436	16,258	18,715	9,697	6,210	4,469	1,512	1,402	2,086	1,084	620	580	1,226	408	404	94,992
Percent of Mean	33.1	17.1	19.7	10.2	6.5	4.7	1.6	1.5	2.2	1.1	0.7	0.6	1.3	0.4	0.4	

Table 9.-Eastside Susitna River drainage sport fish harvest by species, 1977-1994.

Year	Pink Salmon	Coho Salmon	Arctic Grayling	Rainbow Trout	Chum Salmon	Chinook Salmon	Dolly Varden	Sockeye Salmon	Land-locked Salmon	White-Fish	Burbot	Lake Trout	Other	Total
1977	19,663	5,709	7,469	5,225	1,382	1,056	2,726	3,594	512		619	693	626	49,274
1978	50,711	8,573	6,590	5,930	14,203	886	5,640	267	2,368		271	877	153	96,469
1979	11,189	7,564	10,489	9,463	3,791	1,298	3,699	1,020	291		427	472	773	50,476
1980	52,746	10,368	10,959	6,715	4,552	1,370	2,671	873	1,663		367	267	720	93,271
1981	8,143	6,593	11,860	8,813	4,149	2,202	2,874	833	278		220	287	306	46,558
1982	15,345	10,167	9,747	7,536	6,644	2,063	4,066	1,555	996		199	335	345	58,998
1983	3,954	5,176	7,478	9,639	4,982	2,852	4,205	3,221	1,049		901	1,404	469	45,330
1984	9,491	13,916	11,222	7,656	5,211	4,428	4,004	2,705	660	1,058	1,133	362	225	62,071
1985	2,510	7,042	7,822	7,872	2,142	4,342	3,138	1,465	884	1,365	1,085	17	0	39,684
1986	10,527	16,190	10,346	8,061	4,756	8,569	4,213	4,029	2,106	1,090	1,380	1,816	0	73,083
1987	2,209	11,028	7,568	6,647	3,042	8,603	3,946	2,046	145	796	1,175	343	0	47,548
1988	4,129	19,518	6,020	7,622	6,604	9,139	4,748	2,857	619	546	600	291	0	62,693
1989	2,715	17,078	4,562	4,972	4,151	9,783	3,040	2,527	536	442	395	1,210	15	51,426
1990	4,093	11,743	2,910	5,008	1,565	9,423	3,613	2,677	151	1,378	1,345	387	67	44,360
1991	2,001	19,479	3,875	7,854	1,950	9,083	2,140	2,897	14	626	407	726	16	51,068
1992	5,899	33,790	2,189	3,948	2,044	21,307	2,394	3,468	86	265	608	495	76	76,569
1993	3,941	26,063	2,401	3,713	1,480	22,688	1,413	4,137	738	87	909	288	49	67,907
1994	1,968	20,870	3,484	3,658	1,269	14,970	1,033	3,443	45	172	674	239	166	51,991
Mean	11,735	13,943	7,109	6,685	4,107	7,448	3,309	2,423	744	711	706	583	223	59,376
Percent of Mean	19.8	23.5	11.9	11.3	6.9	12.5	5.6	4.1	1.2	1.2	1.2	1.0	0.4	

Table 10.-Westside Susitna River drainage sport fish harvest by species, 1977-1994.

Year	Chinook Salmon	Coho Salmon	Sockeye Salmon	Pink Salmon	Chum Salmon	Lake Trout	Dolly Varden	Rainbow Trout	Arctic Grayling	White-Fish	Northern Pike	Burbot	Smelt	Other Fish	Total
1977	2,938	6,599	2,786	8,142	423	278	2,246	7,472	4,414		132	115		563	36,108
1978	2,039	10,182	1,634	5,605	2,635	596	2,667	12,295	6,725		316	153		370	45,217
1979	5,768	9,036	1,557	1,854	1,154	63	4,591	12,555	9,089		382	454		481	46,984
1980	6,148	12,141	1,111	4,237	491	448	2,825	12,785	9,247		232	706		103	50,474
1981	4,742	5,940	1,408	555	240	297	2,003	11,296	5,250		125	211		86	32,153
1982	8,572	10,658	2,881	2,074	293	167	1,813	11,465	6,525		607	776		366	46,198
1983	9,568	3,570	3,549	712	398	849	2,400	9,253	9,314		944	807		471	41,835
1984	12,106	9,137	3,415	2,467	872	562	798	8,054	7,409		1,821	1,309		598	48,548
1985	13,644	11,270	2,302	584	671	328	1,267	8,114	5,895	525	1,248	560	1,681	104	48,193
1986	13,402	12,804	4,076	3,385	615	157	2,470	6,668	5,441	435	1,519	715	7,300	0	58,987
1987	13,350	14,976	2,397	1,467	688	797	688	7,984	4,908	1,685	1,540	3,640	9,265	31	63,416
1988	15,970	16,210	3,167	2,582	1,474	327	1,401	8,058	4,275	1,419	2,818	944	8,849	0	66,494
1989	19,343	18,009	2,307	1,045	415	352	1,486	4,928	2,104	382	2,257	192	2,324	0	55,144
1990	17,425	13,663	1,938	1,238	234	202	1,214	3,960	2,158	1,381	2,088	1,534	5,591	51	52,677
1991	21,836	19,901	3,083	524	191	289	1,436	4,526	3,367	531	3,931	97	6,132	64	65,908
1992	18,737	15,829	2,916	1,264	304	363	400	2,028	1,572	340	2,777	304	15,523	22	62,379
1993	21,142	15,072	2,161	586	147	276	463	2,481	1,422	555	3,619	264	6,596	49	54,833
1994	10,248	15,062	1,919	1,259	312	113	507	2,526	1,654	779	2,556	1,090	9,483	84	47,592
Mean	12,054	11,931	2,408	2,253	637	359	1,708	7,587	5,043	802	1,606	771	7,274	185	51,192
Percent of Mean	21.5	23.9	4.8	4.3	1.3	0.7	3.3	14.8	9.9	1.6	3.1	1.5	14.2	0.4	

Table 11.-West Cook Inlet drainage sport fish harvest by species, 1977-1994.

Year	Chinook Salmon	Coho Salmon	Sockeye Salmon	Pink Salmon	Chum Salmon	Dolly Varden	Rainbow Trout	Arctic Grayling	White-Fish	Burbot	Smelt	Other Fish	Total
1977	743	532	6	670	7	852	958	0		0	0	0	3,768
1978	478	378	0	650	0	841	723	0		0	0	0	3,070
1979	98	337	0	64	0	846	1,063	0		0	0	0	2,408
1980	34	628	0	301	0	275	560	0		0	0	0	1,798
1981	192	604	48	95	0	958	1,734	0		0	0	0	3,631
1982	147	335	10	210	0	304	398	0		0	0	0	1,404
1983	1,185	564	356	21	10	230	871	10		0	0	0	3,247
1984	1,833	1,035	62	62	0	523	698	37		0	0	0	4,250
1985	2,029	1,431	299	137	50	798	902	0	0	0	0	0	5,646
1986	2,378	983	89	280	213	537	212	89	0	0	0	0	4,781
1987	1,477	2,825	272	72	0	326	579	36	0	0	0	0	5,587
1988	1,695	1,182	455	55	109	164	618	0	0	0	0	0	4,278
1989	2,325	2,270	364	110	54	29	534	143	48	19	0	0	5,896
1990	2,097	1,344	189	24	12	51	438	34	135	0	0	0	4,324
1991	762	2,485	562	44	0	295	404	26	0	0	0	0	4,578
1992	1,213	2,211	57	18	0	205	150	0	0	0	0	0	3,854
1993	1,855	2,960	861	35	0	112	125	0	9	0	0	29	5,976
1994	1,577	2,695	623	8	0	73	254	8	0	0	1,360	9	6,607
Mean	1,214	1,378	236	179	22	412	618	21	22	1	136	2	4,172
Percent of Mean	29.5	33.0	5.7	3.8	0.6	9.9	14.9	0.5	0.5	0.0	3.2	0.0	

Table 12.-Percent of fish released by recreational anglers in the Northern Cook Inlet Management Area for 1990-1994.

	1990		1991		1992		1993		1994		Average
	Catch	Percent Released	Catch	Percent Released	Catch	Percent Released	Catch	Percent Released	Catch	Percent Released	Percent Released
Chinook Salmon	80,485	61.5%	59,961	43.4%	86,500	47.8%	137,446	64.2%	44,875	30.7%	49.5%
Coho Salmon	75,568	39.7%	105,424	32.7%	118,972	34.7%	123,660	35.4%	93,919	28.5%	34.2%
Sockeye Salmon	23,124	48.8%	18,626	37.1%	19,739	40.3%	24,098	45.4%	21,243	47.9%	43.9%
Pink Salmon	40,631	85.2%	17,461	79.9%	51,786	84.1%	47,126	89.7%	29,446	86.9%	85.1%
Chum Salmon	15,239	83.2%	12,989	75.1%	20,761	86.2%	16,960	85.2%	20,442	85.6%	83.0%
Landlocked Salmon	28,017	42.5%	24,174	34.1%	26,489	54.8%	30,388	52.1%	25,431	44.2%	45.6%
Lake Trout	5,052	67.2%	3,932	61.2%	6,373	73.4%	4,835	84.0%	3,972	87.2%	74.6%
Dolly Varden	40,620	66.5%	34,670	59.7%	21,285	66.2%	23,467	75.8%	19,003	72.9%	65.9%
Rainbow Trout	156,460	74.4%	163,694	67.9%	129,627	73.7%	125,179	77.7%	119,624	75.9%	73.9%
Arctic Grayling	46,490	82.4%	38,218	73.5%	38,385	83.7%	39,626	87.0%	49,901	83.9%	82.1%
Whitefish	5,247	33.0%	4,486	54.1%	3,253	73.5%	3,307	73.5%	3,831	68.9%	60.6%
Northern Pike	17,058	83.3%	18,214	63.5%	20,925	74.3%	34,237	83.3%	8,252	52.9%	71.5%
Burbot	4,078	23.0%	2,023	51.5%	2,612	45.9%	3,094	46.5%	3,163	28.0%	39.0%
Smelt	5,591	0.0%	6,151	0.3%	15,523	0.0%	6,596	0.0%	13,433	2.2%	0.5%
Other	837	74.1%	825	90.3%	1,377	33.9%	1,158	73.8%	1,273	66.8%	67.8%
All	544,497	64.8%	510,848	54.3%	563,607	59.0%	621,177	64.8%	457,788	57.7%	60.1%

Table 13.-Percent of fish released by recreational anglers in the Knik Arm and Eastside Susitna River areas, 1991-1994.

	Knik Area								East Susitna Area							
	1991		1992		1993		1994		1991		1992		1993		1994	
Species	Catch	Percent Released	Catch	Percent Released	Catch	Percent Released	Catch	Percent Released	Catch	Percent Released	Catch	Percent Released	Catch	Percent Released	Catch	Percent Released
Chinook Salmon	3,311	31.2%	6,590	39.8%	6,526	44.8%	6,124	29.9%	16,574	45.2%	30,521	30.2%	54,268	58.2%	23,985	37.6%
Coho Salmon	28,808	23.0%	36,317	28.9%	50,674	29.4%	38,734	26.3%	27,942	30.3%	51,981	35.0%	39,888	34.7%	28,717	27.3%
Sockeye Salmon	6,992	28.9%	8,257	35.2%	8,964	33.9%	8,990	43.5%	4,609	37.1%	6,707	48.3%	8,007	48.3%	7,116	51.6%
Pink Salmon	1,581	41.4%	5,706	81.7%	2,263	89.9%	4,352	85.4%	9,400	78.7%	37,170	84.1%	34,652	88.6%	17,729	88.9%
Chum Salmon	1,864	41.0%	2,393	78.7%	4,098	78.4%	4,225	67.9%	9,263	78.9%	15,891	87.1%	9,192	83.9%	12,379	89.7%
Landlocked Salmon	23,915	33.5%	25,743	53.9%	29,125	52.5%	25,232	43.9%	259	94.6%	746	88.5%	1,263	41.6%	199	77.4%
Lake Trout	738	30.6%	2,662	68.4%	1,135	82.3%	309	78.6%	2,723	73.3%	3,070	83.9%	2,513	88.5%	2,490	90.4%
Dolly Varden	16,699	45.3%	10,364	59.6%	9,910	62.8%	9,767	63.8%	5,356	60.0%	7,194	66.7%	8,498	83.4%	6,356	83.7%
Rainbow Trout	88,645	55.3%	85,331	67.2%	69,635	69.0%	70,255	68.1%	26,329	70.2%	19,915	80.2%	24,240	84.7%	23,619	84.5%
Arctic Grayling	8,620	67.0%	10,206	75.4%	6,349	78.8%	13,544	78.6%	12,321	68.5%	16,018	86.3%	14,367	83.3%	16,154	78.4%
Whitefish	1,337	32.7%	578	55.5%	454	50.0%	724	66.6%	1,316	52.4%	1,002	73.6%	757	88.5%	1,157	85.1%
Northern Pike	7,021	61.4%	7,097	63.3%	10,141	79.3%	2,816	52.8%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Burbot	863	44.7%	770	35.1%	771	37.5%	708	27.7%	957	57.5%	1,132	46.3%	1,458	37.7%	1,208	44.2%
Smelt	0	0.0%	0	0.0%	0	0.0%	2,303	0.5%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Other	0	0.0%	1,116	27.2%	226	22.1%	329	50.5%	32	50.0%	152	50.0%	294	83.3%	449	63.0%
Total	190,394	45.6%	203,130	56.5%	200,271	55.1%	188,430	53.5%	117,081	56.4%	191,499	60.0%	199,397	65.9%	141,558	63.3%

Table 14.-Percent of fish released by recreational anglers in the Westside Susitna River and West Cook Inlet areas, 1991-1994.

	West Susitna Area								West Cook Inlet Area							
	1991		1992		1993		1994		1991		1992		1993		1994	
Species	Catch	Percent Released	Catch	Percent Released	Catch	Percent Released	Catch	Percent Released	Catch	Percent Released	Catch	Percent Released	Catch	Percent Released	Catch	Percent Released
Chinook Salmon	38,353	43.1%	44,389	67.5%	70,049	69.8%	12,582	18.6%	1,542	50.6%	5,000	75.7%	6,603	71.9%	2,166	27.2%
Coho Salmon	32,974	39.6%	26,722	40.8%	26,964	44.1%	22,983	34.5%	5,254	52.7%	3,952	44.1%	6,034	50.9%	3,485	22.7%
Sockeye Salmon	5,988	48.5%	4,660	37.4%	5,482	60.6%	4,366	56.0%	798	29.6%	115	50.4%	1,645	47.7%	771	19.2%
Pink Salmon	5,945	91.2%	8,846	85.7%	9,149	93.6%	7,144	82.4%	404	89.1%	64	71.9%	1,062	96.7%	221	96.4%
Chum Salmon	1,644	88.4%	2,462	87.7%	3,579	95.9%	3,597	91.3%	218	100.0%	15	100.0%	91	100.0%	221	100.0%
Landlocked Salmon	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%.0%	0	0.0%
Lake Trout	471	38.6%	641	43.4%	1,177	76.6%	552	79.5%	0	0.0%	0	0.0%	10	0.0%	621	87.6%
Dolly Varden	10,228	86.0%	2,973	86.5%	4,477	83.3%	2,097	75.8%	540	45.4%	754	72.8%	582	80.8%	783	90.7%
Rainbow Trout	46,870	90.3%	23,621	91.4%	29,911	91.7%	25,157	90.0%	1,290	68.7%	762	80.3%	1,411	92.6%	583	70.2%
Arctic Grayling	17,184	80.4%	11,875	86.8%	18,910	92.5%	20,144	91.8%	93	72.0%	286	100.0%	0	0.0%	59	86.4%
Whitefish	1,833	71.0%	1,673	79.7%	2,078	73.3%	1,931	59.7%	0	0.0%	0	0.0%	18	50.0%	19	100.0%
Northern Pike	11,193	64.9%	13,828	79.9%	24,077	85.0%	5,436	53.0%	0	0.0%	0	0.0%	19	100.0%	0	0.0%
Burbot	203	52.2%	709	57.1%	854	69.1%	1,247	12.6%	0	0.0%	0	0.0%	11	100.0%	0	0.0%
Smelt	6,132	0.3%	15,523	0.0%	6,596	0.0%	9,770	2.9%	0	0.0%	0	0.0%	0	0.0%	1,360	0.0%
Other	793	91.9%	109	79.8%	599	92.0%	477	82.4%	0	0.0%	0	0.0%	39	25.6%	18	50.0%
Total	179,830	63.4%	158,031	63.3%	203,902	73.0%	117,483	59.5%	10,139	54.8%	10,948	64.8%	17,525	65.9%	10,317	36.0%

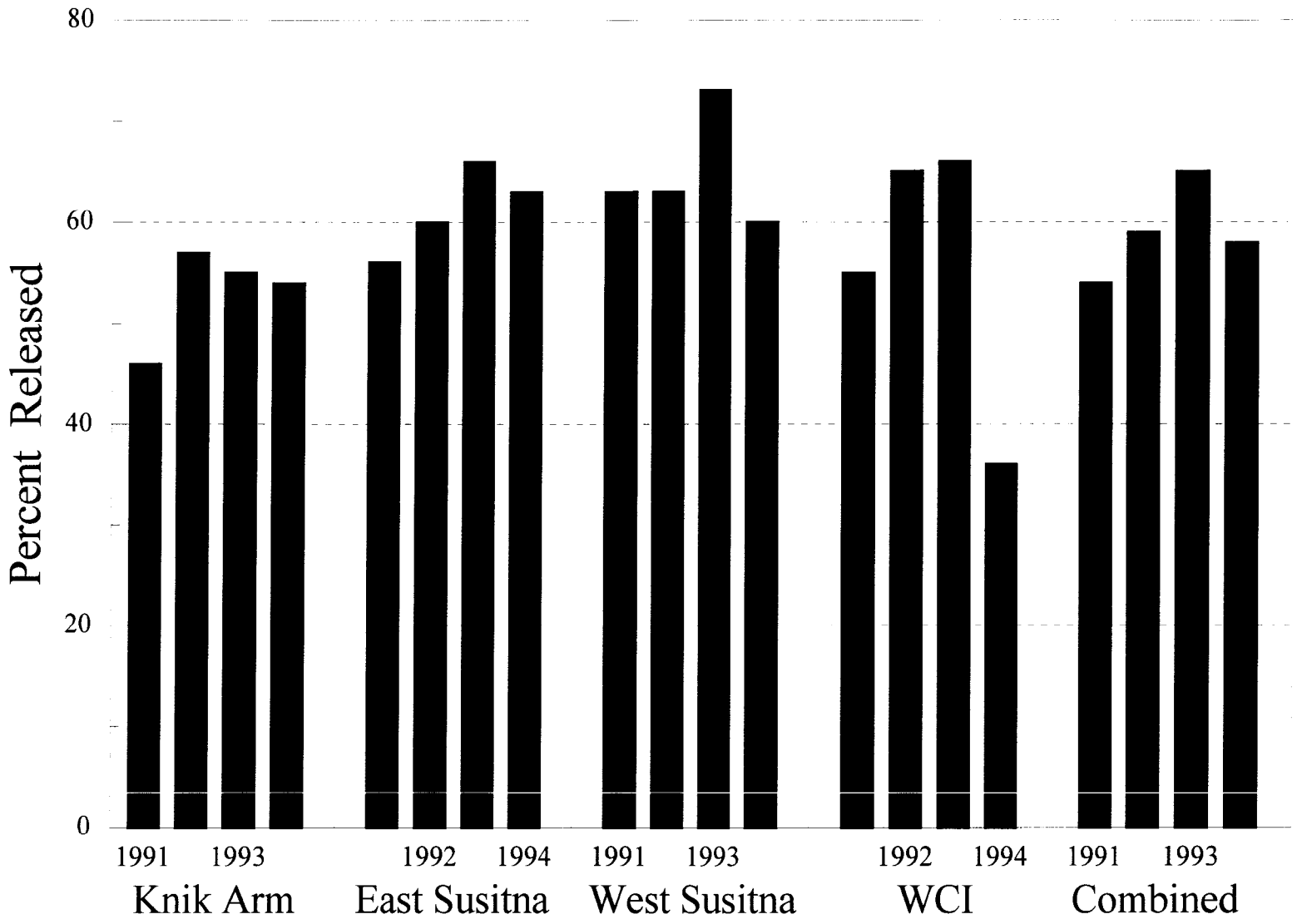

Figure 9.-Percent of the recreational catch of all species from the Northern Cook Inlet Management Area released, 1991-1994, by management unit.

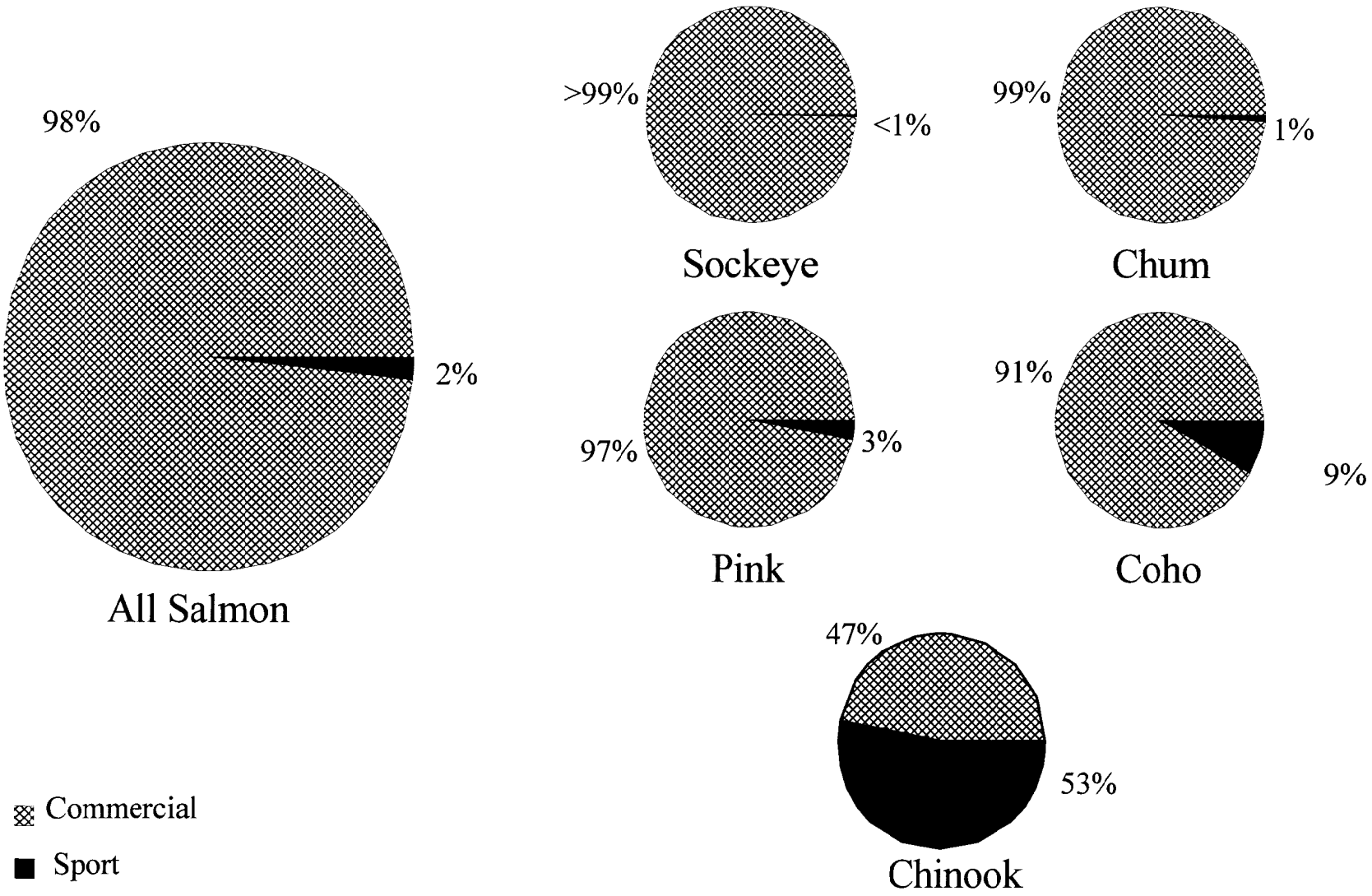

Figure 10.-Composition of the Northern Cook Inlet salmon harvest, 1977-1994.

assumed that NCIMA salmon stocks are intercepted to a larger extent in the drift net and Western District set net fisheries of the Central District (Appendices B3 and B4) and in the set net fishery of the Northern District (Appendices B5-B9) than in other commercial fishing districts. Although quantifiable estimates of contribution to these commercial fisheries by specific stock units are not available for many of the species, a consistently high proportion of the harvests in the Northern District set net fisheries is assumed to be composed of NCIMA stocks, whereas the proportional harvests of NCIMA salmon stocks in the Central District drift and set net fisheries are assumed to be dependent on both time and area fished.

Fish stocks of the NCIMA are also harvested in various subsistence, personal use and educational fisheries. Fisheries that are currently in effect include the Fish Creek personal use salmon fishery, the Upper Cook Inlet subsistence/personal use salmon fishery (including the Tyonek subsistence salmon fishery) and the Eklutna and Knik educational fisheries. Harvests in the subsistence fisheries and the Eklutna and Knik educational fisheries are small in comparison to the commercial and sport salmon harvests. The harvest of sockeye salmon in the Fish Creek personal use fishery is significant when compared to the recreational harvest in NCIMA but not significant when compared to the Cook Inlet commercial harvest.

Educational fisheries were conducted by the native village of Eklutna and the Knik Tribal Council during the 1993, 1994 and 1995 seasons. The fisheries were implemented by permit with specific gear restrictions, and occurred in two areas within Knik Arm under a harvest quota of 1,000 salmon for each permit. A total of 183 salmon were harvested in 1995 under both permits.

ECONOMIC VALUE OF SPORT FISHERIES

Direct estimates are available to assess the economic value of the NCIMA recreational fisheries during 1986 (Jones and Stokes Associates, Inc. 1987). The economic value of the sport fisheries of the NCIMA was estimated to be approximately 29 million dollars (Table 15). This compared to an estimated value of 127 million dollars for Southcentral Alaska sport fisheries during 1986 (Jones and Stokes Associates, Inc. 1987). Resident anglers expended about 18.5 million dollars whereas nonresident anglers expended about 10.6 million dollars.

The Jones and Stokes survey also provided estimates of the direct expenditures for selected NCIMA fisheries (Table 16). These data suggest that considerable variability exists in amount of money expended by anglers, depending upon the species and location fished. Generally, anglers spent more money fishing for chinook and coho salmon than for hatchery-reared fish stocked into lakes. Also, anglers expended more money fishing remote locations than road-accessible locations.

ONGOING RESEARCH AND MANAGEMENT ACTIVITIES

There are eight major research programs presently being initiated, ongoing or being curtailed in the NCIMA. These include:

1. Creel and escapement studies to assess returns of chinook and coho salmon in selected Northern Cook Inlet streams;
2. Stocking, creel and escapement studies to assess returns of wild and hatchery chinook salmon to Willow Creek;

Table 15.-Estimated economic value of NCIMA sport fisheries during 1986[a].

Angler Type	Southcentral Alaska			NCI Management Area		
	Angler-Days	Expenditures	$/Ang-Day	Angler-Days	$/Ang-Day	Expenditures
Resident	1,153,660	74,163,000	64.29	288,613	64.29	18,555,000
Non-Resident	201,488	52,892,000	262.51	40,380	262.51	10,600,000
Both	1,355,148	127,055,000	---[b]	328,993	---[b]	29,155,000

[a] Data from Jones and Stokes Associates, Inc. 1987.

[b] Value not computed.

Table 16.-Economic value for selected NCIMA sport fisheries during 1986[a].

Fishery	Resident Anglers (dollars)	Non-Resident Anglers (dollars)	Total (dollars)
Little Susitna River			
Chinook Salmon Fishing	794,000	666,000	1,460,000
Coho Salmon Fishing	312,000	397,000	709,000
Combined	1,106,000	1,063,000	2,169,000
West Susitna River/WCI			
Chinook Salmon Fishing	2,480,000	2,569,000	5,049,000
Coho Salmon Fishing	278,000	363,000	641,000
Combined	2,758,000	2,932,000	5,690,000
East Susitna River			
Chinook Salmon Fishing	435,000	507,000	942,000
Coho Salmon Fishing	161,000	195,000	356,000
Combined	596,000	702,000	1,298,000
Lake Creek (all species)	541,000	322,000	863,000
Kepler Lake Complex			
Rainbow Trout Fishing	162,000	2,000	164,000
Big Lake			
Rainbow Trout Fishing	214,000	40,000	244,000
All Sites	5,377,000	5,061,000	10,438,000

[a] Data from Jones and Stokes Associates, Inc. 1987.

3. Assessment of the return of chinook salmon to the Little Susitna River;
4. Assessment of the return of chinook salmon to the Deshka River including estimates of the marine interception, inriver return, and spawning escapement to the Deshka River;
5. Creel and escapement studies to assess returns of nonhatchery and hatchery coho salmon to the Little Susitna River;
6. Evaluation of the differences in survival and growth between stocked mixed sex and triploid coho salmon and between mixed sex and all-female rainbow trout in Mat-Su Valley lakes,
7. Distribution, abundance, and age composition studies of northern pike in the Susitna River drainage; and
8. Population inventory of the Cottonwood Creek drainage.

It is anticipated that emphasis among these programs will change over time, with programs being reduced or curtailed as findings are obtained and as new priorities are established.

Routine management activities that occur in the NCIMA include:

1. Participation in the BOF process,
2. Fishery monitoring and inseason fishery management,
3. Involvement with the public,
4. Enforcement of fishing regulations,
5. Habitat monitoring and permit review,
6. Assisting with annual fish stockings, and
7. Providing input on public access issues.

MAJOR BIOLOGICAL AND SOCIAL ISSUES FOR NCIMA

There are several major biological and social issues associated with the NCIMA which affect area fisheries. Issues of importance that were discussed in the 1993 and 1994 Area Management Reports (AMR) for Recreational Fisheries of Northern Cook Inlet (Whitmore et al. 1994, 1995) in which the status has not changed are:

1. Willow Creek State Recreational Area,
2. Timber Development,
3. Improved or expanded access,
4. Development of coal reserves,
5. Allocation,
6. Chinook salmon escapement enumeration, and
7. Regulation enforcement.

These issues will not be discussed in this report.

Additional biological or social issues which affect these fisheries include:

1. Northern Cook Inlet chinook salmon. Since 1990 a trend of decreasing abundance of observed chinook salmon escapement has been noted in numerous NCIMA streams. In order to increase escapements, regulations were implemented prior to the 1993 season aimed at reducing recreational chinook salmon harvest. The 1993 escapement counts indicated continuing problems in selected streams and additional restrictions were put into effect by emergency order (E.O.) prior to the 1994 season. However, during 1994 the majority of the streams continued to fall below their established escapement goals. Additional restrictions were adopted for the 1995 season aimed at further reducing the recreational harvest in NCIMA waters and the Northern District commercial chinook salmon harvest. This issue will be discussed in greater detail in Section II of this report.

   Along with the biological issue of decreased chinook salmon runs comes the social impact of restricting the fisheries involved. Recreational guiding has become an established industry in the NCIMA. The Susitna River drainage supports the majority of the commercial guiding business. With increased restrictions comes decreasing income opportunities for the established guides and the surrounding communities.

2. Susitna Basin Recreation Rivers Management Plan. In the spring of 1988, the Alaska legislature passed the Recreation Rivers Act and assigned oversight responsibilities related to this act to the Alaska Department of Natural Resources (ADNR). This act established six recreation rivers: Little Susitna River, Deshka River (including Moose and Kroto creeks), Talkeetna River, Lake Creek, Talachulitna River, and Alexander Creek. The legislation was enacted to insure that all state lands and waters within the six river corridors are maintained and enhanced for recreation and wildlife purposes. A 2-year planning process was completed, which included input from affected individuals, groups, agencies and officials throughout the area. The plan (ADNR 1991) was adopted as ADNR policy in the spring of 1991 following legislative review of the document. Regulations associated with the plan were available for public comment through January 7, 1994. Regulations will be in effect for the 1996 season.

   Temporal and spatial zoning of the Little Susitna River for motorized and nonmotorized boating is among the most controversial aspects of the plan. The plan allows alternating weekends for the use of motorized and nonmotorized boats in the lower portion of the river. The alternating weekend concept only applies from May 15 through August 20. The nonmotorized aspect of the plan for other recreation rivers is also a controversial issue.

   Other controversial aspects of the Recreation Rivers Management Plan include a permit fee for commercial users and a maximum 4-day camping limit per site.

3. Susitna River sockeye salmon. Sockeye salmon returns to the Susitna River, as evaluated by a sonar unit in the Yentna River, have achieved the escapement objective during 4 of the last 5 years. Susitna River sockeye salmon are harvested in the mixed-stock commercial fishery of Cook Inlet, primarily in the drift gillnet fishery in the Central District, as well as inriver recreational fisheries. Commercial fishery managers manage the fisheries to meet escapement goals of the Susitna River without exceeding the escapement range in the Kenai River. Recreational anglers would like more sockeye salmon allocated to the Susitna and Kenai rivers for inriver fisheries. The BOF during their 1992 meeting elected not to address this allocation issue. A bill was introduced to the legislature for the 1994 session to require

15% of the harvestable surplus of sockeye salmon be allocated to the recreational fisheries. This bill was not adopted, however it did focus attention upon the allocation issue.

4. Little Susitna River. Recreational use of the Little Susitna River is increasing tremendously. In association with this increased use is the need to provide more support facilities and education, with the hope of maintaining a pristine environment. Several recommendations are outlined in the access program section of this report regarding the Little Susitna River.

   In response to public perception by residents of the Houston area that the weir at river mile 32.5 delays salmon run timing, and the decision to drop the Little Susitna River coho stocking program, the weir will be moved to a site upstream of the Parks Highway bridge beginning in the 1996 season.

ACCESS PROGRAM

The Federal Aid program stipulates that at least 12.5% of the federal funds passed on to states be used to enhance angler access to sport fisheries. There are several access programs under way and being planned in the NCIMA. The following is a summary of the major projects in which acquisition, development, or maintenance is being considered or has recently been implemented.

Neil Lake, Deshka River Drainage

A 2.88 acre parcel at river mile 23 on the Deshka River was purchased June of 1995. This parcel provides a continuous corridor between the Deshka River and Neil Lake. Neil Lake is a float plane accessible lake that supports significant private and charter aircraft traffic, providing transportation to anglers accessing the Deshka River recreational fishery. This site is just outside the Deshka State Recreational River Corridor. The Recreational River Act Management Plan identifies the need for better access to the river from the lake and suggests that private lands be purchased to improve access. The weekend residents of Neil Lake will be contacted during the spring of 1996 regarding interest in litter control. This action may generate a contract with one of the residents for site maintenance. The cabin associated with this site has been removed and identification signs have been installed.

Susitna Landing

Susitna Landing is located at the confluence of the Kashwitna River with the Susitna River and is accessible by vehicle at mile 82.5 on the Parks Highway. A concessionaire contracted by the department operates the facility. Services provided at the landing include parking, boat launch, and camping facilities. The concessionaire additionally operates a convenience store.

Since the department purchased the facility in 1986, few improvements have been made beyond general site maintenance. In order to reduce annual maintenance cost associated with this facility, it is appropriate to upgrade or replace components in a state of disrepair. The old, dilapidated concession stand has been dismantled and replaced with a new prefabricated building. This new building is presently operating with temporary hook-ups and will be permanently located in the spring of 1996. Other improvements which will be implemented during the 1996 calendar year include:

1. Construction of a covered picnic area,
2. Installation of electrical hook ups for motor homes,
3. Construction of a handicap access ramp to the double vault toilets, and

4. Dredging below both boat launch ramps to alter water flows and reduce future maintenance dredging.

It should be noted that a Department of Corrections (DOC) labor force will be utilized on the nontechnical facets of these construction projects.

Some other improvement slated for the future at this site include:

1. Construction of a handicapped accessible dock on one side of the launch to facilitate boarding boats,
2. Installation of a cement slab for the launch ramp,
3. Permanent tie ups for boats, and
4. Stabilization of the bank upstream of the boat launch ramp.

Sheep Creek

The Sheep Creek parking and camping area provides anglers with access to the confluence of Sheep Creek and the Susitna River. This site, a popular chinook and coho salmon fishing location, is accessible by road from mile 86.3 on the Parks Highway. Contracts are established annually with local maintenance companies to pump the vaulted toilets, empty dumpsters, and provide general facility cleaning. The trail from the parking area to the stream is steep. A switchback has been incorporated into the trail to reduce the slope. A program to allow handicapped anglers to use four wheelers on this trail, which is too steep for wheel chair use, is being developed.

A section of the trail was repaired during the 1994 season. A section of culvert was installed under the trail to address erosion problems. Included with the standard site maintenance on this facility during the FY 96-97 season, a small wooden bridge will be constructed across an eroded portion of the access trail. The bridge will comply with the Americans with Disabilities Act (ADA) and will be wide enough to support handicap ATV access.

Caswell Creek

The Caswell Creek parking and camping area provides anglers with access to the confluence of Caswell Creek and the Susitna River. This site, a popular chinook and coho salmon fishing location, is accessible by road from mile 84 on the Parks Highway. The department has been granted management authority over a 30 acre tract, including this site, from ADNR. Contracts are established annually with local maintenance companies to provide and maintain portable toilets, empty dumpsters, and provide general facility cleaning. Improvements that need to be made at this site include:

1. Smooth and grade the road, adding necessary material to allow access during rainy periods,
2. Upgrade parking within the facility, and
3. Upgrade the trail from the parking/camping area to the stream to reduce erosion along the trail.

Matanuska-Susitna Lakes Projects

The Matanuska-Susitna lakes support over 40,000 angler days of activity annually. Over 60 lakes are stocked with game fish on an annual basis (Table 17 and Appendix C). A volunteer, Gene Horning, traveled to each of the stocked lakes in April and May of 1994 using the

department's public handout for direction. Mr. Horning made notes regarding problems in locating access sites and in following the access to the lakes. He additionally photographed parking areas, trail heads and lake access junctions. Mr. Horning put together a series of three-ring notebooks with notes and photographs identifying the current status of access sites and recommendations on access site improvements. A summary of his findings is presented in Table 18.

In support of the lake fishing program, handouts have been made for each stocked lake. They include a bathometric map of the lake, directions to the public access, stocking history and description of available facilities. These maps need to be updated with the land status of lake front property identified as public or private lands. Prior to updating these maps, public use easements need to be verified. Additionally, public handouts need to be constructed for other lakes that have public access and support recreational fishing opportunities. This work is ongoing.

To provide better angler access and increase fishing opportunities, access improvements should be made on an annual basis. Efforts should be directed to a few lakes annually. Current projects include:

1. Twin Island Lake easement acquisition. Land status research is being performed to determine availability.
2. Lorraine Lake easement acquisition and development. An application for public easement has been submitted overlying a traditional route crossing Borough land. Improvements will include gravel hardening of an existing parking area and foot trail. Signage will be provided for public identification.
3. Tigger Lake easement acquisition and development. An application for public easement will be submitted to ADNR for a short walk-in trail. Subsequent clearing and signage, to define the trail, will be performed upon easement classification.
4. Bruce Lake public use easement will be developed into a foot access trail. This will require some brushing and signage.
5. Bearpaw Lake existing access site and parking area will be hardened with a compactable gravel fill.
6. Barley Lake public use easement will be upgraded with gravel fill, as needed, along with the construction of a boardwalk crossing marshy ground to the water's edge. Signage will be provided for access identification and to define a parking area.
7. Horseshoe Lake (Pt. MacKenzie) section line easement will be developed into a foot trail and a stairwell leading down an embankment to the waters edge. This project is slated for spring 1996 construction.

Table 17.-Northern Cook Inlet Management Area lake stocking summary for nonanadromous fish, 1995.

LAKE STOCKED	SURFACE ACRES	DATE STOCKED	NUMBER STOCKED	FIN[a] MARK	BROODSTOCK[b] (TREATMENT)	HATCHERY	STOCKING SIZE	STOCKING[c] METHOD
RAINBOW TROUT (1995)								
Barley	18.6	07/27/95	1,482		95 Swanson R	Ft. Richardson	1.40g	T/BU
Bearpaw	45	07/27/95	4,500		95 Swanson R	Ft. Richardson	1.90g	T/BU
Bench	52	08/14/95	3,439		95 Swanson R(TAF)	Ft. Richardson	2.40g	A
Big No Luck	67.9	08/14/95	5,519		95 Swanson R(TAF)	Ft. Richardson	2.40g	A
Carpenter	176.4	07/25/95	17,991		95 Swanson R	Ft. Richardson	1.40g	T
Christiansen	179	07/27/95	12,744		95 Swanson R	Ft. Richardson	1.90g	T
		07/27/95	5,156		95 Swanson R	Ft. Richardson	1.30g	T
Coyote	2.4	06/30/95	300		94 Swanson R(TAF)	Ft. Richardson	97.50g	T
Crystal	131.7	07/26/95	13,170		95 Swanson R(TAF)	Ft. Richardson	1.40g	T
Dawn	11.8	07/31/95	2,360		95 Swanson R(TAF)	Ft. Richardson	1.40g	T/BU
Diamond	139	07/25/95	13,964		95 Swanson R	Ft. Richardson	1.40g	T
Echo	23	05/30/95	2,405		94 Swanson R	Ft. Richardson	93.90g	T
Farmer	21	07/25/95	1,128		95 Swanson R	Ft. Richardson	1.40g	T/BU
Finger	362	07/16/95	36,119		95 Swanson R	Ft. Richardson	0.90g	T
Florence	54.6	07/27/95	5,460		95 Swanson R	Ft. Richardson	1.90g	T/BU
Homestead	17	07/31/95	3,400		95 Swanson R(TAF)	Ft. Richardson	1.40g	T/BU
Honeybee	58	07/28/95	5,950		95 Swanson R	Ft. Richardson	1.80g	T/BU
Ida	46	08/01/95	4,842		95 Swanson R	Ft. Richardson	1.90g	T/BU
Irene	18	06/29/95	1,914		94 Swanson R (TAF)	Ft. Richardson	97.50g	T/BU
Kalmbach	125	07/28/95	12,527		95 Swanson R	Ft. Richardson	1.80g	T
Kashwitna	160	07/26/95	16,000		95 Swanson R(TAF)	Ft. Richardson	1.40g	T
Kepler-Bradley	58	05/16/95	4,235		94 Swanson R(AF)	Ft. Richardson	105.40g	T
		06/07/95	2,015		94 Swanson R	Ft. Richardson	101.80g	T
		06/13/95	2,245		94 Swanson R	Ft. Richardson	105.80g	T
		07/14/95	5,150		95 Swanson R	Ft. Richardson	1.00g	T
		07/14/95	550		95 Swanson R	Ft. Richardson	0.90g	T
Knik	50.4	06/07/95	2,474		94 Swanson R	Ft. Richardson	101.80g	T
Lalen	91.9	08/16/95	9,387		95 Swanson R(TAF)	Ft. Richardson	2.50g	T
Loberg	10.9	06/30/95	1,100		94 Swanson R(TAF)	Ft. Richardson	97.50g	T
Long [K/B]	74.4	07/14/95	7,741		95 Swanson R	Ft. Richardson	1.00g	T
		07/14/95	599		95 Swanson R	Ft. Richardson	0.90g	T
Long (Mi. 86)	106	05/17/95	775		94 Swanson R	Ft. Richardson	97.40g	T
		05/17/95	709		94 Swanson R	Ft. Richardson	96.30g	T
		05/17/95	1,161		94 Swanson R	Ft. Richardson	105.00g	T
		07/05/95	1,035		94 Swanson R(TAF)	Ft. Richardson	97.00g	T
		07/05/95	51		92 Swanson R	Ft. Richardson	500.00g	T
		08/01/95	11,295		95 Swanson R	Ft. Richardson	1.90g	T
Loon	108	07/28/95	10,800		95 Swanson R(TAF)	Ft. Richardson	1.40g	T
Lorraine	132	07/25/95	13,235		95 Swanson R	Ft. Richardson	1.40g	T/BU
Lucille	362	07/28/95	72,627		95 Swanson R(TAF)	Ft. Richardson	1.40g	T
Lynne	70	07/28/95	7,000		95 Swanson R	Ft. Richardson	1.80g	T

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Table 17.-Page 2 of 5.

LAKE STOCKED	SURFACE ACRES	DATE STOCKED	NUMBER STOCKED	FIN[a] MARK	BROODSTOCK[b] (TREATMENT)	HATCHERY	STOCKING SIZE	STOCKING[c] METHOD
RAINBOW TROUT (1995) Continued								
Marion	113	07/25/95	11,274		95 Swanson R	Ft. Richardson	1.40g	T/BU
Matanuska	61.5	05/16/95	4,946		94 Swanson R(AF)	Ft. Richardson	105.40g	T
		06/07/95	4,454		94 Swanson R	Ft. Richardson	101.80g	T
		06/13/95	2,466		94 Swanson R	Ft. Richardson	105.80g	T
Memory	84	07/28/95	8,123		95 Swanson R	Ft. Richardson	1.80	T
North Friend	81.4	07/27/95	8,140		95 Swanson R(TAF)	Ft. Richardson	1.40g	T
Prator	98	07/28/95	9,800		95 Swanson R	Ft. Richardson	1.80g	T
Ravine	12.3	08/01/95	2,632		95 Swanson R	Ft. Richardson	1.90g	T/BU
Reed	19.5	07/31/95	2,700		95 Swanson R	Ft. Richardson	1.90g	T/BU
Seventeenmile	100	08/01/95	10,526		95 Swanson R	Ft. Richardson	1.90g	T
Seymour	229	07/28/95	22,900		95 Swanson R(TAF)	Ft. Richardson	1.40g	T
		11/ 29 /95	4,671		95 Swanson R(TAF)	Ft. Richardson	11.3g	T
Slipper (Eska)	9.1	06/30/95	900		94 Swanson R(TAF)	Ft. Richardson	97.50g	T
South Friend	55.7	07/27/95	5,570		95 Swanson R(TAF)	Ft. Richardson	1.40g	T/BU
South Rolly	107.7	07/26/95	21,540		95 Swanson R(TAF)	Ft. Richardson	1.40g	T
Tigger	18.9	08/03/95	1,946		95 Swanson R	Ft. Richardson	1.90g	T/BU
Twin Island	151	08/14/95	15,089		95 Swanson R(TAF)	Ft. Richardson	2.40g	A
Vera	110.5	07/26/95	11,050		95 Swanson R(TAF)	Ft. Richardson	1.40g	T/BU
Visnaw	130.7	08/16/95	13,196		95 Swanson R(TAF)	Ft. Richardson	2.50g	T
Walby	53.9	06/29/95	2,572		94 Swanson R(TAF)	Ft. Richardson	97.50g	T
		7/27/95	5,390		95 Swanson R(TAF)	Ft. Richardson	1.40g	T
Weiner	21	08/01/95	4,258		95 Swanson R(TAF)	Ft. Richardson	1.40g	T
West Sunshine	22	07/27/95	2,230		95 Swanson R(TAF)	Ft. Richardson	1.40g	T/BU
Willow	143.3	07/27/95	14,300		95 Swanson R(TAF)	Ft. Richardson	1.40g	T
Wishbone	52.7	08/14/95	2,738		95 Swanson R(TAF)	Ft. Richardson	2.40g	A
Wolf	62	07/31/95	12,400		95 Swanson R(TAF)	Ft. Richardson	1.40g	T/BU
"X"	101.4	07/27/95	5,055		95 Swanson R	Ft. Richardson	1.90g	T/BU
"Y"	39.7	07/27/95	3,970		95 Swanson R	Ft. Richardson	1.90g	T/BU

RAINBOW TROUT (1995 Totals Stocked)

Number of lakes: 54

Number of surface acres: 4,395.2

	Diploid Mixed-Sex	Diploid All-Female	Triploid All-Female	TOTAL STOCKED
# Broodstock	51	0	0	51
# Catchables	18,704	9,181	7,821	35,706
# Fingerling	223,459	0	280,174	503,633
Total Rainbow Stocked:	242,214	9,181	287,995	539,390

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Table 17.-Page 3 of 5.

LAKE STOCKED	SURFACE ACRES	DATE STOCKED	NUMBER STOCKED	FIN[a] MARK	BROODSTOCK[b] (TREATMENT)	HATCHERY	STOCKING SIZE	STOCKING[c] METHOD
COHO SALMON (non-anadromous) [1995]								
Barley	18.6	05/10/95	1,860		94 Bear Lake	Elmendorf	5.80g	T/BU
Bear Paw	45	05/11/95	4,500		94 Bear Lake	Elmendorf	6.40g	T/BU
Carpenter	176.4	05/10/95	17,600		94 Bear Lake	Elmendorf	5.80g	T
Christiansen	179	05/18/95	17,900		94 Bear Lake	Elmendorf	8.60g	T
Diamond	139	05/11/94	13,900		94 Bear Lake	Elmendorf	6.40g	T/BU
Echo	23	05/09/95	2,300		94 Bear Lake	Elmendorf	5.69g	T
Kalmbach	125	05/09/95	12,500		94 Bear Lake	Elmendorf	5.69g	T
Klaire	9	05/09/95	900		94 Bear Lake	Elmendorf	5.69g	T/BU
Knik	50	05/10/95	5,000		94 Bear Lake	Elmendorf	5.80g	T
Loberg	10.9	05/09/95	1,100		94 Bear Lake	Elmendorf	5.69g	T
Memory	83	05/09/95	8,300		94 Bear Lake	Elmendorf	5.69g	T
Prator	98	05/11/95	9,800		94 Bear Lake	Elmendorf	6.40g	T
Rocky	58.7	05/11/95	2,900		94 Bear Lake	Elmendorf	6.40g	T
Victor	13.5	05/09/95	2,700		94 Bear Lake	Elmendorf	5.69g	T/BU

COHO SALMON (non-anadromous) [1995 Totals Stocked]

Number of lakes: 14

Number of surface acres: 1,029.1

	Bear Lake Diploid Mixed-Sex
# Fingerling:	101,260
Total Coho Stocked:	101,260

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Table 17.-Page 4 of 5.

LAKE STOCKED	SURFACE ACRES	DATE STOCKED	NUMBER STOCKED	FIN[a] MARK	BROODSTOCK[b]	HATCHERY	STOCKING SIZE	STOCKING[c] METHOD
ARCTIC GRAYLING (1995)								
Canoe	21	09/21/95	4,200		95 Moose L.	Clear	5.17g	T/BU
Finger	362	09/11/95	18,100		95 Moose L.	Clear	4.86g	T
Florence	54.6	09/21/95	5,460		95 Moose L.	Clear	5.17g	T/BU
Kepler-Bradley	58	09/11/95	5,800		95 Moose L.	Clear	4.86g	T
Knik	50.4	09/25/95	2,500		95 Moose L.	Clear	5.28g	T
Long [Mi. 86]	106	09/11/95	10,600		95 Moose L.	Clear	4.86g	T
Lorraine	132	09/25/95	13,200		95 Moose L.	Clear	5.30g	T/BU
Meirs	16.8	09/21/95	3,400		95 Moose L.	Clear	5.17g	T/BU
Reed	19.5	09/21/95	1,950		95 Moose L.	Clear	5.17g	T/BU
Seventeenmile	100	09/11/95	10,000		95 Moose L.	Clear	4.86g	T
"Y"	39.7	09/25/95	3,900		95 Moose L.	Clear	5.30g	T/BU

ARCTIC GRAYLING (1995 Totals Stocked)
Number of lakes: 11
Number of surface acres: 960

	Moose Lake
Fingerling	79,110
Total Grayling Stocked:	79,110

ARCTIC CHAR (1995)								
Benka	123	06/12/95	12,300		1994 hatchery brood	Clear	10.24g	T
Finger	362	06/14/95	3,200		1994 hatchery brood	Clear	9.80g	T
Irene	18	06/14/95	1,800		1994 hatchery brood	Clear	9.80g	T/BU
Lynne	70	06/14/95	7,000		1994 hatchery brood	Clear	9.80g	T/BU

ARCTIC CHAR (1995 Totals Stocked)
Number of lakes: 4
Number of surface acres: 573

	1994 hatchery brood
Fingerling	24,300
Total Arctic Char Stocked:	24,300

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Table 17.-Page 5 of 5.

LAKE STOCKED	SURFACE ACRES	DATE STOCKED	NUMBER STOCKED	FIN[a] MARK	BROODSTOCK[b]	HATCHERY	STOCKING SIZE	STOCKING[c] METHOD
CHINOOK SALMON (1995)								
Finger	362	10/25/95	19,604		1994 Willow Ck.	Ft. Richardson	93.20g	T
		10/26/95	7,011		1994 Willow Ck.	Ft. Richardson	93.20g	T
		10/26/95	2,857		1994 Willow Ck.	Ft. Richardson	94.50g	T
		11/01/95	4,987		1994 Willow Ck.	Ft. Richardson	94.20g	T
		11/02/95	1,495		1994 Willow Ck.	Ft. Richardson	93.10g	T

CHINOOK SALMON (1995 Totals Stocked)
Number of lakes: 1
Number of surface acres: 362

	1994 Willow Ck.
Catchables	35,954
Total Chinook Stocked:	35,954

ALL SPECIES

Number of lakes: 60
Number of surface acres: 4,637.2

# Rainbow Trout	539,390
# Coho Salmon (non-anadromous)	101,260
# Chinook Salmon (non-anadromous)	35,954
# Arctic Grayling	79,110
# Arctic Char	24,300
Total Fish Stocked (1995)	780,014

[a] FIN MARK: LV = diploid mixed-sex; RV = diploid all-female.

[b] TREATMENT: (AF) = diploid all-female; (TAF) = triploid all-female.

[c] Stocking Method: A = airdrop; T = tank truck; T/BU = carried in buckets to lake

Table 18.-Northern Cook Inlet Management Area stocked lakes access summary, 1994.

LAKE	ACCESS ROUTE	EASEMENT[a] CLASSIFICATION	PARKING AREA	TRAIL CONDITION	% PUBLIC SHORELINE	COMMENTS
Barley	needs sign	P.U.E.	uses farm area	steep, dirt	1%	conflict with farm property
Bearpaw	good	P.U.A.	limited to road R.O.W.	rutted 4WD track	50%	designated public park in plat maps
Benka	good	P.U.A.	2 vehicle gravel	access rd. ends at lake	0.5%	conflict with pvt property; no camping
Beverly	good	S/L (33')	5 vehicle gravel	needs sign, swampy	15%	needs sign at "Y" in trail; State land
Big	good	S.R.A.	20 vehicle gravel	concrete boat launches	2%	2 State Rec. Sites; camping
Big No Luck	canoe trail	S.R.A.	15 vehicle gravel	canoe trail: 1.5 miles	100%	Nancy Lake S.R.A.; camping
Bruce	good	P.U.E. (60')	limited to road R.O.W.	cleared section line	1%	shoreline muskeg; improve parking
Canoe	good	S.R.A.	6 vehicle gravel	packed gravel	21%	dock, picnic tables, outhouse; K/B Rec.
Carpenter	last mile is 4WD	P.U.E. (150')	3 vehicle, dirt	access rd. ends at lake	0.7%	new access being developed
Christiansen	needs sign	S/L (100')	6 vehicle gravel	access rd. ends at lake	0.4%	gravel boat launch; no camping
Coyote	good	P.U.A.	2 vehicle gravel	good	100%	borough blocked rd. access to park
Crystal	needs sign	P.U.E. (60')	10 vehicle gravel	access rd. ends at lake	0.4%	gravel boat launch; no camping
Dawn	good	P.U.A.	8 vehicle gravel	needs boardwalk	5%	designated public park: Tract C
Diamond	good	S/L (50')	6 vehicle gravel	needs improvement	36%	conflicts with prop owners; adj. state land
Echo	good	Rd. R.O.W.	4 vehicle paved pull-out	signed, gravel	15%	shoreline trees, brush; pvt campground
Farmer	good	S/L	limited to road ROW	needs better signing	1%	shoreline muskeg; improve parking
Finger	good	S.R.A.	30 vehicle gravel	access rd. ends at lake	5%	State Rec. Site, camping
Florence	good	S/L (66')	limited to road R.O.W.	good	0.8%	improve parking; no camping
Homestead	need signs	R.O.W. Ease. (50')	limited to access rd.	access rd. ends at lake	1%	shoreline swampy; no camping
Honeybee	need signs	P.U.A.	limited to access rd.	needs work, swampy	6%	access road is not public; adj. State land
Ida	need signs	P.U.E. (20')	4 vehicle gravel	steep, gravel	0.1%	no camping
Irene	good	S.R.A.	4 vehicle gravel	gravel	15%	K/B Rec. Area
Kalmbach	good	S/L	5 vehicle gravel	need signs, swampy	20%	need sign at "Y" in trail; adj. State land
Kashwitna	good	Rd. R.O.W.	30 vehicle paved	access is by lake	10%	shoreline muskeg along R.O.W.
Kepler/Bradley	good	S.R.A.	30 vehicle gravel	marked, gravel	89.5%	private camping
Klaire	good	S.R.A.	30 vehicle gravel	.4 mile; needs sign	100%	brushy shoreline; K/B Rec. Area
Knik	good	P.U.A.	2 vehicle gravel	access rd. ends at lake	0.6%	no camping
Lalen	good	P.U.E. (20')	2 vehicle gravel	access rd. ends at lake	0.2%	gravel boat launch; no camping
Loberg	good	Rd. R.O.W.	3 vehicle gravel	access rd. ends at lake	6%	brushy shoreline along R.O.W.
Long (Mile 86)	good	S.R.A.	15 vehicle gravel	access rd. ends at lake	90%	State Rec. Site; camping
Long (K/B)	good	S.R.A.	7 vehicle gravel	packed dirt, steep	100%	hook & release only; K/B Rec. Area
Little Lonely	need signs	S/L	1 vehicle dirt	short, dirt	0.5%	access rd. can be 4WD; no camping
Loon	good	P.U.E. (50')	limited to access rd.	access rd. ends at lake	0.4%	no camping
Lorraine	need signs	MSB property	6 vehicle gravel	muddy, rutted by 4WD	95%	surrounded by borough land
Lucille	good	P.U.E.	3 vehicle gravel	access rd. ends at lake	4%	2 access sites; camping at Lucille Park
Lynne	need signs	P.U.A.	2 vehicle dirt	access rd. ends at lake	2%	access rd. is not public; 2% is State land
Marion	good	P.U.A.	4 vehicle gravel	steep dirt, some erosion	12%	adj. to MSB land
Matanuska	good	S.R.A.	30 vehicle gravel	short gravel	35%	docks, picnicking, outhouse; K/B Rec. Area
Meirs	good	P.U.E.	8 vehicle, can be muddy	steep, dirt	1%	no camping
Memory	good	S/L (33')	4 vehicle, gravel	access rd. ends at lake	0.3%	no camping
Mile 180	need sign	Rd. R.O.W.	10 vehicle, paved pullouts	pullouts beside lake	40%	lakeshore muskeg
Morvro	need signs	S/L (33')	limited to rd. R/W	swampy, rough	0.3%	needs work with trail & parking
North Friend (Montana)	good	Rd. R.O.W.	10 vehicle gravel cross Parks	short trail to outlet	0.5%	access Parks R.O.W.
Prator	good	P.U.A.	4 vehicle gravel	access rd. ends at lake	2%	Castle Public Park; no camping
Ravine	needs sign	P.U.A.	4 vehicle gravel	steep, worn	50%	adj. State land
Reed	good	P.U.E. (10')	limited to rd. R/W	ends in drop-off	0.2%	improve parking; no camping

-continued-

Table 18.-Page 2 of 2.

LAKE	ACCESS ROUTE	EASEMENT[a] CLASSIFICATION	PARKING AREA	TRAIL CONDITION	% PUBLIC SHORELINE	COMMENTS
Rocky	good	S.R.A.	30 vehicle gravel	access rd. ends at lake	5%	State Rec. Site; camping
Ruby	ATV, no signs	Trail Easement (50')	15 vehicle gravel	5 mile ATV trail	40%	new surveyed trail, adj. state land
Seventeenmile	need signs	P.U.A.	8 vehicle gravel	access rd. ends at lake	0.6%	need no camping signs
Seymour	good	S/L (83')	4 vehicle gravel	access rd. ends at lake	0.5%	boat launch being developed
Slipper (Eska)	good	Rd. R.O.W.	20 vehicle gravel	access rd. ends at lake	75%	last 1/4 mile rough
South Friend (Montana)	good	Rd. R.O.W.	10 vehicle gravel	short, dirt	10%	shoreline swampy along R.O.W.
South Rolly	good	S.R.A.	20 vehicle gravel	access rd. ends at lake	100%	State Rec. Site; camping
Tigger	needs sign	State prop.	2 vehicle gravel	needs marked	100%	trail around lake, State land
Twin Island	needs signs	MSB prop.	4 vehicle gravel	needs marked	0.6%	MSB prop conflict/ mental health land
Vera	good	S/L (50')	6 vehicle dirt	soft tundra	0.3%	no camping
Victor	good	S.R.A.	30 vehicle gravel	dirt, some mud	100%	brushy shoreline; K/B Rec. Area
Visnaw	needs sign	S/L	3 vehicle gravel	access rd. ends at lake	0.4%	no camping
Walby	good	P.U.A.	6 vehicle gravel	access rd. ends at lake	1%	no camping
Wiener	good	Rd. R.O.W.	(2) 4 vehicle pullouts	pullouts beside lake	25%	access along Glenn Hwy.
West Sunshine	good	P.U.E. (20')	4 vehicle gravel	steep, dirt	0.4%	no camping
Willow	good	S/L (50')	30 vehicle gravel	access rd. ends at lake	0.4%	access by Willow Comm. Center
Wishbone	needs signs	State prop.	4 vehicle dirt	rough 4WD only	100%	hook & release only, State land
Wolf	good	S.R.A.	10 vehicle gravel	short dirt	33%	S.R.A.; camping
"X"	good	State prop.	2 vehicle dirt	need boat	100%	hook & release only; State land
"Y"	good	Rd. R.O.W.	2 vehicle dirt	short, steep	100%	brushy, State land

[a] R.O.W. = right of way
S/L = section line easement (feet wide)
P.U.A. = dedicated (or reserved) public use area (parcel platted for public recreation)
P.U.E = dedicated public use easement (feet wide)
S.R.A. = state recreation area (parcel managed by State Parks)
MSB = Matanuska Susitna Borough

8. Butterfly Lake (Pt. MacKenzie) public use easement has been developed into a gravel foot trail and wooden dock extending over a marsh to the water's edge. Also included in this project was a gravel upgrade of the access road. Construction was completed and afforded by the Department of Corrections, Pt. MacKenzie Correctional Facility, as a cooperative effort with ADF&G.
9. At Honeybee and Lynne lakes, an application for public easement has been submitted overlying a traditional route crossing Borough land. Subsequent improvements may include road widening, hardening of the parking area and construction of boardwalks crossing marshy areas.
10. At Christiansen Lake, develop the public use easement and Borough Park in cooperation with the Mat-Su Borough.

A Department of Corrections labor force will be used on the nontechnical facets of the construction projects on Bruce, Bearpaw, Barley, and Horseshoe lakes. DOC will also provide post construction maintenance of the sites located on Point MacKenzie.

State Recreation Sites

There are several State Recreation Sites along the road system of the NCIMA. State Recreation Sites are on state lands that are managed by the Department of Natural Resources, Division of Parks and Outdoor Recreation. These sites all allow day use and the majority provide camping opportunities. The majority of these sites require payment of a fee for facility use. In general, camping opportunities adjacent to lakes and streams along the road system are limited. At the majority of recreation sites adjacent to lakes and streams Sport Fish Restoration moneys were used in development of at least parking areas and boat ramps. It is appropriate to use access monies in maintaining and improving these facilities as they often provide outstanding opportunities to people in the pursuit of power boating and recreational fishing activities.

1. Finger Lake. The Finger Lake State Recreational Site is within the core area of the Matanuska-Susitna Borough. The site provides camping, day use, fishing, swimming and other recreational opportunities. The facility is adjacent to urban and residential areas of the borough and is generally full during the open-water period of the year. It also supports significant day use during the winter months, primarily for ice fishing. An ADA accessible fishing dock is needed here to allow full access to the site.
2. Nancy Lake. The Nancy Lake State Recreation Site, on the northeast shore of Nancy Lake, has 30 camping sites and is reached from mile 66.5 on the Parks Highway. The Nancy Lake recreation site is a popular area, especially during the open water season. Nancy Lake is within the Nancy Lake State Recreation Area which is one of Alaska's few flat, lake-studded landscapes preserved in its natural state for recreation.

   Nancy Lake is also one of the larger lakes in the NCIMA and supports a significant amount of power boat activity. A boat ramp is presently in use at the Nancy Lake Recreation Site. However, this ramp is old and needs to be upgraded. A double lane boat ramp needs to be installed. Additionally, the dock associated with this ramp needs to be upgraded and a new fishing dock needs to be installed. Upgrading this facility is not expected to significantly increase power boating and angling on this lake. However, it is expected to curtail a significant drop in participation.

3. Bonnie Lake. The Bonnie Lake parking area and boat launch was graded during 1995. Continued site maintenance will be provided by ADNR Division of Parks and Outdoor Recreation. The department will provide pumping of vaulted toilets and design for future construction of a fishing dock.

Little Susitna River

The Little Susitna River, which is rich in fishery resources, is approximately 110 miles long. The river originates in the Talkeetna Mountains and borders one of the state's fastest growing population centers. As development of this area occurs it is important that appropriate facilities are developed to maintain the pristine characteristics of this drainage.

Little Susitna River Public Use Facility

The Little Susitna Public Use Facility (LSPUF), in operation since 1990, provides boat launch, parking, camping, and dump station services. The LSPUF is within the Susitna Flats State Game Refuge and is managed by the Department of Fish and Game. Operation of the facility has been contracted annually to the Department of Natural Resources, Division of Parks and Outdoor Recreation. User fees are collected by ADNR staff to offset the cost of facility operation and maintenance. Operation of the facility has cost approximately $70,000 annually with fee collection approaching $25,000 per year through the 1993 season. Access funds are annually used to pay the difference in cost of operation between the cost contracted with the Division of Parks and user fees. A series of meetings began during the summer of 1993 to consider modification of the user fee schedule. An advisory committee was established to: (1) recommend a new fee structure, (2) recommend services to be provided, and (3) recommend facility improvements. As a result of the meetings, the fee structure was increased prior to the 1994 season. In addition to modification of the fee structure, the management of the facility was significantly modified resulting in better service to the public.

New fees charged for parking, use of the dump station and commercial use of the facility have been initiated. A seasonal camping pass was added and the daily camping fee increased from $6 to $10 per day. The seasonal launch and parking pass increased from $50 to $75 and the daily launch and park fee remained unchanged at $5. A daily parking fee was established at $2 per car. A seasonal parking pass was provided for $25 per season. These increases went into effect during the 1994 season. It is anticipated that the increase in the fee structure will result in the collection of approximately $55,000 annually. Expansion of services provided has increased the cost of the program. The contract with the Division of Parks and Outdoor Recreation for the 1995 season will be approximately $100,000. Modification of the fee schedule was initiated during 1995 to increase the daily parking fee to $5 and the seasonal parking pass to $75.

Use of the LSPUF has increased steadily. During 1994 the road was paved to within 4.5 miles of the facility. The parking area had been filled to capacity on several occasions but the facility remained open allowing people into the facility to search for parking. These high use days put tremendous strain on the facility.

Overall the LSPUF is in good condition. Improvements that need to be made within the facility, beyond that of annual maintenance, include:

1. Installation of 30 picnic tables,
2. Installation of 30 fire rings,

3. Permanent boat tie ups in the area above the launch, and
4. A system needs to be designed to allow fish offal collected at the fish cleaning table to be removed.

State Game Refuge

As use of the LSPUF increases, use outside the facility but within the State Game Refuge also increases. Habitat related problems along the river are escalating and include bank erosion and loss of riparian vegetation. The primary areas of damage include the trail system which has developed from angler use adjacent to the LSPUF and at specific boat-accessible camp sites along the river. These sites are often associated with fishing holes. Minimum improvements which need to occur include:

1. Public education to inform anglers of use techniques which will minimize habitat degradation,
2. Trail design and construction for angler use to minimize bank erosion and habitat degradation,
3. Campsite design and construction to minimize bank erosion and habitat degradation, and
4. Initiation of restoration measures in severely damaged areas.

Little Susitna River-Parks Highway

Prior to upgrading of the road and development of the LSPUF, the majority of angler participation on the Little Susitna River occurred in the Parks Highway Bridge area (mile 57). As fishing from the LSPUF has become more crowded, there has been a shift of angler participation back to this area. With this increase in participation comes a need to provide additional angler support facilities. Such improvements may include parking and sanitation facilities. It is in the best interest of the program to meet with area residents and officials from the City of Houston and the Matanuska-Susitna Borough to determine what their priorities are for facility development.

Talkeetna Boat Launch Project

The object of the Talkeetna Boat Launch Project is to upgrade the existing boat ramp and parking area in Talkeetna. Additionally, sanitary facilities will be upgraded. These improvements will provide the public with a boat launch facility that is safe, convenient and clean. The parking lot will be designed for 60 vehicles with boat trailers, three of which will be accessible to persons with physical disabilities. The boat ramp will be 24 feet wide, constructed of concrete. At least one public restroom and garbage dumpster will be incorporated into the site. A kiosk positioned close to the boat launch will contain information regarding navigation, safety, land status, and recreational issues. It is anticipated that construction of this project will be initiated in the spring of 1996.

Eklutna Tailrace

Eklutna Tailrace is located at Mile 4 of the Old Glenn Highway, adjacent to the Cook Inlet Aquaculture Association salmon hatchery. This drainage currently supports chum, coho and sockeye salmon returns, all of which are currently being enhanced by the local hatchery. This is a very popular fishery due to its relative proximity to heavily populated areas. The fishery occurs on property owned, and previously managed, by the Alaska Power Authority (APA). During the

1994 season APA decided to no longer manage this site as a public fishery due, in part, to substantial increases in public participation. As a result, the Department of Fish and Game has been granted management authority over the recreational activity occurring at this site. During the 1995 season the department contracted dumpster, porta potty and cleaning services to facilitate sanitation needs at the site. The department will provide the same level of service during the 1996 season. This drainage is also being considered, by the department, for future stocking with chinook salmon. Access enhancements such as expanded vehicle parking and stream bank stabilization are being considered if this future enhancement is done.

Knik River Boat Launch Project

The Knik River and associated tributaries have supported up to 20,000 angler days of fishing annually. Although many of the fishing sites in this drainage are road accessible, many are not. In addition to providing fishing opportunity, the Knik River provides the nearest power boat operation site to Anchorage. Currently, no developed launch site is present on this river. Boat launching is conducted from sand bars along the river, which often change over the course of the season. Current sites are not safe or convenient. A boat launch needs to be constructed adjacent to the Glenn Highway.

Chulitna River Boat Launch

Development of a boat launch on the Chulitna River would provide boat access to vast areas currently not accessible and increase angling opportunities.

SECTION II: MAJOR FISHERIES OVERVIEW

CHINOOK SALMON FISHERIES

Chinook salmon runs to the NCIMA collectively comprise the largest stock of this species within the entire Cook Inlet drainage. Within the management area, the Susitna River supports the largest stock of chinook salmon. The Susitna River stock is considered to be the fourth most abundant in Alaska, smaller only than the Yukon, Kuskokwim and Nushagak river stocks (Delaney and Vincent-Lang 1992). Harvests of NCI chinook salmon varied from 11,000 to 70,000 from 1893 through 1940, averaging about 38,500 fish (Table 19). This harvest level of Northern Cook Inlet chinook salmon appears to be sustainable, considering that this level was maintained for over a half century. However, when harvest levels increased to an average of 84,500 chinook salmon annually from 1940 to 1952, a steady decline in harvests occurred until fisheries were closed to allow stocks to rebuild (Figure 11). This harvest history suggests that the maximum sustainable harvest range for NCI chinook salmon is between 38,500 and 84,500 fish. Therefore, a management objective for NCIMA chinook salmon is to maintain harvests by all user groups between 45,000 and 55,000 fish. Some recent harvests of NCI chinook salmon have been at the upper end of this range (Table 20). The 1994 harvest of 36,183 (Table 20) fell below the management objective. Although estimates of total return are unavailable for Northern Cook Inlet chinook salmon (largely due to our inability to accurately estimate spawning escapement) the collective annual return is believed to number from 100,000 to 200,000 fish (Delaney and Vincent-Lang 1992).

In 1976, the Magnuson Fishery Conservation and Management Act was enacted. This act, sometimes known as the 200-mile limit law, extended federal fishery management authority into waters from 3 to 200 miles from the United States coast. The effects of this law on Cook Inlet chinook salmon are not fully understood, however, it seems likely that the act and its associated fishery management plans increased chinook salmon returns to NCI.

The chinook salmon returns to the NCIMA have historically been harvested by a variety of users including recreational, commercial, and subsistence/personal use fishermen (Table 20). However, harvest strategies for NCI chinook salmon have changed substantially since the 1890s. The fishery has slowly evolved from a mixed-stock commercial harvest to a recreationally-dominated harvest that targets a multitude of discrete substocks. A detailed user history is documented in Whitmore et al. 1993.

Since 1986, under the Northern District King Salmon Management Plan (5 AAC 21.366), a directed commercial chinook salmon fishery has occurred with a 12,500 fish quota system. Additionally, up to 1,000 chinook salmon of NCIMA origin are incidentally captured in commercial fisheries taking place along the western shores of the Central District of Cook Inlet. Mean and peak harvest from the Northern District commercial fisheries, which harvest chinook salmon bound for NCIMA streams, during 1986 through 1995 have been 8,534 and 15,488 fish, respectively (Appendix B5).

Cautious incremental expansion of fishing opportunity characterized the recreational chinook fishery from 1979 through 1990. Mean and peak harvest of NCIMA recreational chinook

Table 19.-Estimated harvests of chinook salmon of Northern Cook Inlet origin, 1893-1994.

Year	Harvest[a]	Year	Harvest[a]	Year	Harvest[a]
1893	24,000	1935	60,060	1977	5,446
1894	12,400	1936	64,850	1978	4,430
1895	20,159	1937	68,786	1979	9,837
1896	14,461	1938	46,130	1980	11,301
1897	11,266	1939	42,181	1981	11,372
1898	13,111	1940	50,413	1982	17,121
1899	13,682	1941	83,858	1983	18,706
1900	21,346	1942	76,144	1984	23,996
1901	27,455	1943	89,105	1985	25,842
1902	39,210	1944	68,168	1986	43,192
1903	52,818	1945	55,362	1987	40,335
1904	24,058	1946	51,425	1988	44,153
1905	14,134	1947	85,443	1989	50,981
1906	17,936	1948	84,797	1990	42,430
1907	50,355	1949	89,025	1991	43,404
1908	27,019	1950	130,274	1992	48,475
1909	47,699	1951	150,010	1993	54,235
1910	39,222	1952	59,600	1994	36,183
1911	44,676	1953	71,544		
1912	38,293	1954	52,260		
1913	50,922	1955	37,199		
1914	38,043	1956	52,248		
1915	67,034	1957	34,214		
1916	50,316	1958	18,278		
1917	52,399	1959	26,226		
1918	27,909	1960	22,031		
1919	19,041	1961	15,822		
1920	31,650	1962	16,216		
1921	11,157	1963	14,106		
1922	24,824	1964	3,698		
1923	23,929	1965	7,801		
1924	21,610	1966	815		
1925	40,826	1967	623		
1926	60,496	1968	1,163		
1927	69,923	1969	3,927		
1928	55,908	1970	1,853		
1929	54,155	1971	10,494		
1930	57,854	1972	5,748		
1931	41,122	1973	246		
1932	56,745	1974	238		
1933	47,425	1975	301		
1934	57,903	1976	692		

[a] Source of data: 1893-1968 Delaney and Vincent Lang 1992; 1969-1994 Ruesch and Fox 1995, Mills 1979-1994, and Howe et al. 1995 (see Table 20 of this report).

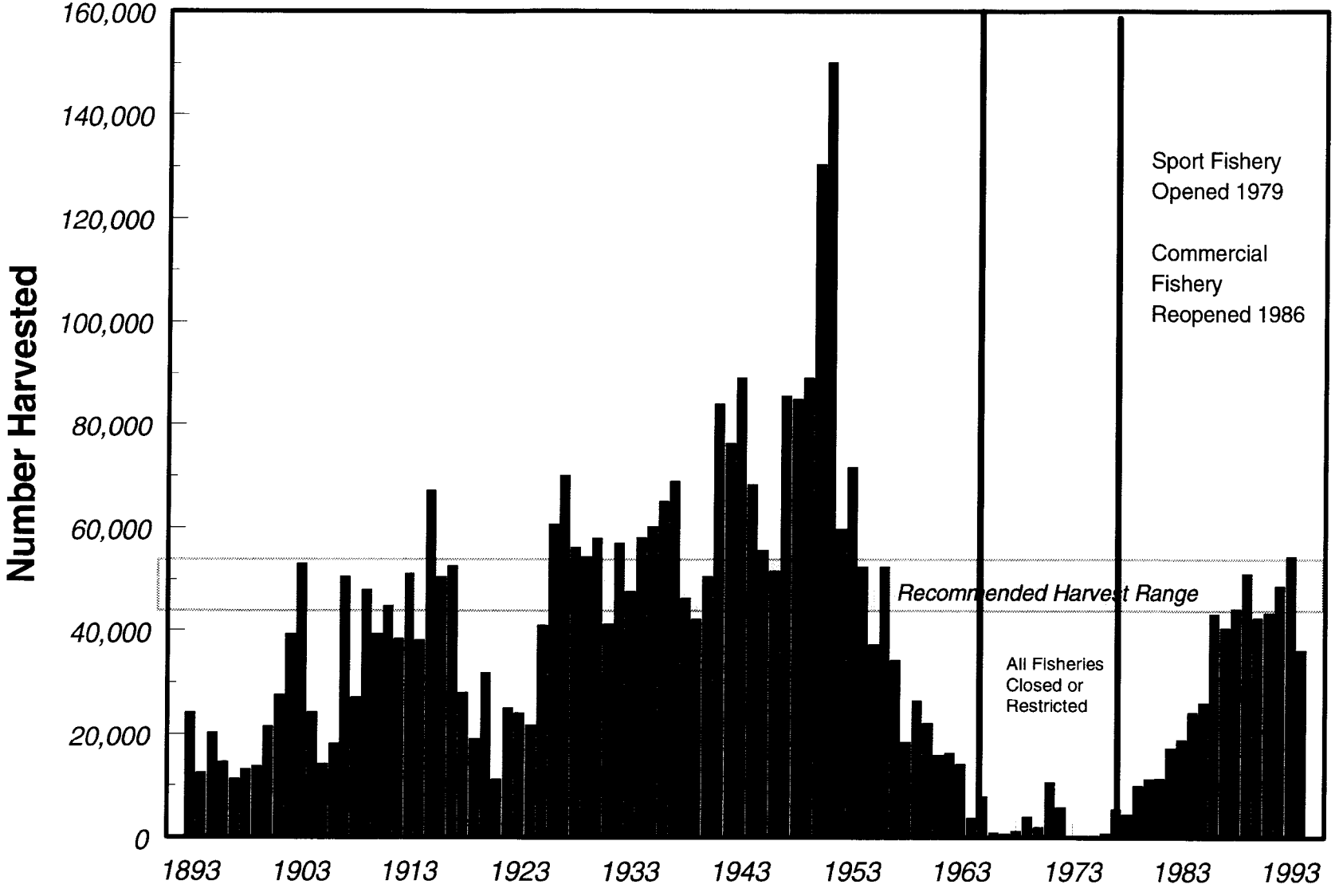

Figure 11.-Estimated harvests by all user groups of chinook salmon of Northern Cook Inlet origin, 1893-1994.

Table 20.-Northern Cook Inlet Management Area origin chinook salmon estimated harvests, 1977-1995.

	Commercial[a]			Recreational[b]					Subsistence[c]	
Year	NCI[d]	Kustatan	Total	Knik Arm Drainages	Eastside Susitna	Westside Susitna	West Cook Inlet	Total		Grand Total
1977	565	207	772	207	1,056	2,938	473	4,674		5,446
1978	666	221	887	140	886	2,039	478	3,543		4,430
1979	1,714	159	1,873	800	1,298	5,768	98	7,964		9,837
1980	993	174	1,167	646	1,370	6,148	34	8,198	1,936	11,301
1981	725	43	768	1,466	2,202	4,724	192	8,602	2,002	11,372
1982	2,716	391	3,107	1,666	2,063	8,573	147	12,449	1,565	17,121
1983	933	163	1,096	1,255	2,852	9,568	1,185	14,860	2,750	18,706
1984	1,004	214	1,218	2,057	4,428	12,106	1,833	20,424	2,354	23,996
1985	1,890	211	2,101	1,889	4,342	13,644	2,029	21,904	1,837	25,842
1986	15,488	308	15,796	1,524	8,569	13,402	2,378	25,873	1,523	43,192
1987	12,701	176	12,877	2,476	8,603	13,350	1,477	25,906	1,552	40,335
1988	12,836	123	12,959	2,916	9,139	15,970	1,695	29,720	1,474	44,153
1989	12,731	1,144	13,875	4,341	9,783	19,343	2,325	35,792	1,314	50,981
1990	9,582	1,084	10,666	2,022	9,423	17,425	2,097	30,967	797	42,430
1991	6,859	925	7,784	2,277	9,083	21,836	762	33,965	1,655	43,404
1992	4,554	964	5,518	3,969	21,307	18,737	1,213	40,913	2,044	48,475
1993	3,277	424	3,701	3,602	22,688	21,142	1,855	49,287	1,247	54,235
1994	3,185	449	3,634	4,303	14,970	10,248	1,577	31,098	1,451	36,183
1995	4,130	198	4,328	No data available for recreational harvest					2,098	6,426

[a] Source of data, Ruesch and Fox *In prep.*

[b] Source of data, SWHS, Mills 1979-1994 and Howe et al. 1995.

[c] Source of data, Ruesch and Fox *In prep*: Includes Tyonek subsistence fishery 1980-1995 and Northern/Central districts subsistence fisheries 1985 and 1991-1993. 1994-1995 data include Northern districts, Ruesch and Fox *In prep.*

[d] Northern District total.

salmon fisheries from 1986 through 1994 have been 33,724 and 49,287 fish, respectively (Table 7) (Mills 1988-1994, Howe et al. 1995). The emergency orders which modified regulations for these fisheries since 1991 are outlined in Appendix D. The regulation history of chinook salmon in Northern Cook Inlet waters is outlined in Appendix E.

A marine recreational fishery has developed in recent years along the eastside beaches of the Kenai Peninsula (Deep Creek, Ninilchik and Whiskey Gulch area) which targets mixed stocks of early-run chinook salmon. Stock specific origins of these mixed-stock harvests are unknown, but it is assumed that a portion of this harvest is made up of fish bound for NCIMA waters.

Regulations providing for subsistence fisheries and personal use fisheries have changed in recent years as a result of BOF and court actions. Currently there is one subsistence fishery, two personal use fisheries and two educational fisheries authorized in the NCIMA. In 1980 a subsistence set gillnet fishery was authorized at the village of Tyonek as a component of the Upper Cook Inlet Salmon Management Plan. This fishery is presently regulated by a 4,200 chinook salmon harvest quota, however, the annual harvest has never exceeded 2,800 chinook salmon (Table 21). In addition the Upper Cook Inlet Subsistence Salmon Management Plan allowed a set gillnet fishery along the west side of northern Cook Inlet extending to Fish Creek during 1985, 1991, 1992 and 1994. In 1995 the BOF, in response to court action closing the fishery, allowed a personal use fishery in place of the existing subsistence fishery. This personal use fishery was operated under the same regulations that ruled the previous subsistence fishery. The Fish Creek Personal Use Fishery, administered under the Cook Inlet Personal Use Salmon Dip Net Fishery Management Plan (5 AAC 77.545), also occurs in the NCIMA. The harvest of chinook salmon is prohibited in this fishery. The native villages of Eklutna and Knik were issued educational permits to fish salmon. Harvests have remained small totaling only five chinook salmon (28 for all species) in 1995 for the Knik village and 14 chinook salmon (155 for all species) for the Eklutna village.

Recent Board of Fisheries Action

During the November 1992 BOF meeting, several regulations regarding NCIMA chinook salmon were implemented. Through implementation of a harvest record system a seasonal limit of five chinook salmon was established for all waters of Cook Inlet. We believe implementation of this regulation has had only a small effect on the total harvest of chinook salmon because the majority of anglers do not harvest five chinook salmon in a season. The regulation provides a tool to help enforce daily bag and possession limits and address a social concern that a few anglers are harvesting a significant portion of the catch.

Another regulation that the BOF adopted, affecting all waters of NCIMA, prohibits an individual or company engaged in freshwater sport fish guiding from participating in chinook salmon sport fishing while clients are present, except when guiding a client subject to the Americans with Disabilities Act.

The BOF also took action during 1992 to stabilize recreational chinook salmon harvests in the Deshka River and the Susitna River drainage downstream of the Deshka River. Recreational harvests in these fisheries have increased significantly over the past decade while observed spawning escapements have decreased. To stabilize harvests in these fisheries, the BOF reduced bag and possession limits for chinook salmon to one and two fish, respectively.

Table 21.-Northern Cook Inlet Management Area subsistence gillnet and personal use gillnet salmon harvests, 1980-1995.

Year	Number of Permits[a]	Chinook	Sockeye	Coho	Pink	Chum
Tyonek Fishery						
1980	67	1,936	262	0	0	0
1981	70	2,002	269	64	32	15
1982	69	1,565	209	0	0	0
1983	75	2,750	185	40	0	2
1984	75	2,354	nd[b]	nd[b]	nd[b]	nd[b]
1985	76	1,720	44	8	0	nd[b]
1986	65	1,523	198	210	45	44
1987	61/64	1,552	161	149	5	24
1988	42/47	1,474	52	185	6	9
1989	47/49	1,314	67	175	0	1
1990	37/42	797	92	366	124	10
1991	54/57	1,105	25	80	0	0
1992	44/57	905	74	234	7	19
1993	53/12	1,247	43	36	11	9
1994	49/58	840	41	111	0	22
1995	55/70	1,271	45	123	14	15
Mean		1,522	110	111	15	11
Northern/Central Districts Subsistence and Personal Use Fisheries						
Subsistence Fisheries						
1985						
North (E./W.)/Cent	638	117	2,218	1,427	90	121
Knik Arm	405	4	1,649	2,055	48	212
Total	1,043	121	3,867	3,482	138	333
1986-1990			No Fishery			
1991						
Northern (E./W.)		92	1,383	1,009	90	399
Knik Arm		21	2,952	1,698	339	1,139
Central		383	16,520	665	88	58
Total	7,065	550	32,230	3,520	537	1,598
1992						
Northern (E./W.)		348	3,733	2,511	316	576
Knik Arm		132	5,203	2,328	354	965
Central		477	20,013	3,982	547	212
Total	9,200	1,139	46,419	10,320	1,818	1,827
1993			No Fishery			
1994						
Northern (E./W.)		375	5,830	3,602	365	708
Knik Arm		236	7,419	2,736	353	680
Central		890	40,084	5,843	2,257	341
Total	4,900/10,127[c]	1,501	53,333	12,181	2,975	1,729
Personal Use Gillnet Fisheries[d]						
1995						
Northern (E./W.)	545	558	7,200	3,543	272	775
Knik Arm	816	269	13,440	3,928	431	1,202
Central	73	110	805	558	32	116
Total	1,434	937	21,445	8,029	735	2,093
Annual Mean		850	31,459	7,506	1,214	1,516

[a] Number of permits returned for early/late season.

[b] No data available.

[c] Number of permits returned/number of permits issued.

[d] In 1995 the subsistence fishery was replaced with a personal use fishery.

The BOF also took action to reduce harvests in select West Cook Inlet drainage streams. These streams have depressed chinook salmon stocks caused partly by flood events during the mid and late 1980s. To allow these stocks to rebuild, the BOF:

1. Shortened the fishing season for chinook salmon by 13 days for West Cook Inlet drainage streams (the current season runs from January 1 through June 30).
2. Reduced the bag and possession limit for chinook salmon to one fish over 16 inches.
3. Created waters closed to the retention of chinook salmon in the Chuitna, Theodore, and Lewis rivers and eliminated bait from the fisheries in these waters.

A summary of November 1992 BOF actions is included in Appendix F.

In addition to BOF action, during the first legislative session in June of 1992 legislators passed House Bill 596. This bill included provisions that prohibited anglers over 16 years of age from fishing for chinook salmon in Alaskan waters unless they had purchased the current year's king salmon stamp and had it in possession. Anglers must attach the tag to the back of their sport fishing license and validate it by signing their name across the tag.

During their October 1994 meeting the BOF delegated authority to restrict chinook salmon harvests in Northern Cook Inlet to the Commissioner of the ADF&G in order to address stock conservation concerns. With this authority the department established a conservative management strategy for the 1995 season.

Management Strategy

Biological escapement goals (BEG) to assure for the long-term viability of NCIMA chinook salmon stocks have been established for 17 NCIMA chinook salmon spawning streams. Spawning escapement is indexed annually using helicopter surveys and weirs. The combined aerial survey escapement goal for NCIMA is 36,700 chinook salmon. From the late 1970s through 1989 escapement objectives were achieved. However, since 1990, observed spawning escapements in selected streams have decreased and the combined escapement goal for NCIMA has not been achieved since 1992. The reasons for the declining spawning escapement are not clearly understood. Escapement levels which produced the 1993 through 1995 returns were above average. The decline is not believed to be linked to inadequate parent-year escapements as age compositions have remained relatively unchanged since 1980. The cause for the decline may be more closely associated with the increase in harvest of these stocks (Table 20).

A decline in the chinook salmon harvest in the Northern District commercial set gillnet fishery has also occurred in recent years (Appendix B5). Harvests of chinook salmon in other Cook Inlet commercial fisheries are minimal as these fisheries do not begin until July at which time most NCI chinook salmon have entered fresh water. Harvests of chinook salmon in some State of Alaska managed commercial fisheries outside of Cook Inlet have increased in recent years. Although numbers of fish harvested in these fisheries is known, it is not known if a significant portion of this harvest was made up of Northern Cook Inlet origin chinook salmon. Federally managed groundfish commercial fisheries catch chinook salmon as incidental bycatch, however, numbers and streams of origin of fish in these harvests are largely unknown.

Factors which may have contributed to reduced production of chinook salmon other than recreational or commercial harvests include: (1) poor egg to smolt survival during the freshwater

period of their life cycle, (2) poor survival during the marine portion of their life cycle, and (3) environmental conditions and predation during these periods.

The intent of the restrictions adopted during the December 1992 BOF meeting was to stabilize the total harvest between 45,000 and 55,000 chinook salmon annually. Record chinook salmon harvests occurred during the 1993 season and the combined BEG for NCIMA chinook was not obtained. Low escapement counts in several streams in the Susitna River drainage, notably the Deshka River and Prairie Creek, were the major cause. These two streams have historically supported the largest chinook salmon returns in the NCIMA. To arrest declining escapements in the Deshka River, emergency orders were issued prior to and during the 1994 season to further restrict chinook harvests. Although these actions are thought to have decreased harvests, the combined BEG for the NCIMA was not achieved again in 1994. Specifically, only five of 17 systems achieved their desired escapement levels.

Regulation changes were made to increase the spawning escapement into NCIMA streams during the 1995 season. The goal of these regulation changes was to reduce the chinook salmon harvest to half of the 1994 harvest level.

The BOF, during its October 1994 work session, choose to delegate to the department the authority to change regulations for the 1995 fishing season. Regulation changes were made as follows:

1. The Deshka River and Prairie Creek were closed to fishing for chinook salmon;
2. Alexander Creek above the confluence of Trail Creek was closed to fishing for chinook salmon;
3. The bag and possession limit in the Susitna River drainage was reduced to one chinook salmon over 16 inches in length;
4. The use of bait throughout the NCIMA was prohibited (excluding the Anchorage Management Unit);
5. Fishing in the NCIMA was allowed only between the hours of 6:00 a.m. and 11:00 p.m. May 15 through July 13. This time restriction did not apply to that portion of the Susitna River drainage currently opened to weekend-only fishing (e.g. between, but not including, the Deshka River and the Talkeetna River) and the Anchorage Management Unit; and
6. The first opening of the Northern District commercial chinook salmon fishery occurred by emergency order. Additional openings of this fishery were dependent upon inseason indications of run strength.

With these restrictions in place 1995 inseason harvest surveys showed a decrease in the harvest by approximately 50% of the 1994 level. The 1995 escapement goals in all eastside Susitna River index streams except Prairie Creek were exceeded. However, the overall escapement goal was still not achieved, as nine of the 10 streams in the Westside Susitna and West Cook Inlet management units did not reach their goals.

Knik Arm Unit Chinook Salmon Fishery

Background and Historical Perspective

The Little Susitna River (Figure 12), is the only Knik Arm Management Unit stream open to the harvest of chinook salmon. It supports a major chinook salmon fishery as well as the largest coho salmon fishery in the NCIMA. Chinook salmon bound for the Little Susitna River are also harvested in the Upper Cook Inlet subsistence fisheries, in the Northern District commercial fishery and possibly saltwater sport fisheries adjacent to the Kenai Peninsula.

Access to the Little Susitna River occurs at three primary locations: (1) intertidal waters of the river are accessed by boats crossing the marine waters of Knik Arm from the Port of Anchorage public boat launch, (2) road accessible Little Susitna Public Use Facility which includes a launch and campground, and (3) private and public launches near the Parks Highway which provide access to the upper reaches of the river. The Little Susitna Public Use Facility is by far the most heavily used access to the river. Power boats can travel from the mouth of the river to the Parks Highway during periods of moderate to high water levels. However, during low flows travel is restricted to smaller jet boats between river mile 28 and the Parks Highway at river mile 70.

Chinook salmon return to the Little Susitna River from late May through early July with the peak immigration approximately mid-June. Spawning occurs from the Burma Road area upstream to Hatcher Pass with the majority taking place upstream of the Parks Highway bridge. Few chinook salmon use tributaries for spawning. Peak spawning occurs during the last week of July.

Chinook salmon fishing is permitted from the river's mouth upstream to the Parks Highway, a distance of about 70 miles. The chinook salmon fishing season is from January 1 through July 13.

Inseason harvest and fishing effort for chinook salmon were estimated by onsite creel surveys from 1979 through 1990. Findings from the creel surveys indicated harvest estimates from the SWHS accurately represented the fishery, therefore, the creel survey was discontinued in 1991. The average estimated annual harvest of chinook salmon from the Little Susitna River for the 10-year period 1985-1994 was 2,824 (Figure 13, Appendix A3) (Mills 1985-1994 and Howe et al. 1995).

Due to the semiglacial character of the Little Susitna River, successful aerial survey counts of chinook salmon spawning areas cannot be conducted annually. Chinook salmon aerial escapement surveys were completed during 10 of the years from 1983 through 1995. The average chinook salmon escapement index during these years, based on aerial surveys, was 1,327 fish with a peak escapement count of 3,197 fish in 1988 (Table 22). During 1988, 1989, 1994 and 1995 a weir was operated and escapement counts were obtained. These counts ranged from 2,809 to 7,400 (Table 22).

Recent Fishery Performance

The 1994 sport harvest of chinook salmon from the Little Susitna River was 4,204 fish (Howe et al. 1995). The 1994 harvest tied with 1989 for the highest harvest on record and was approximately 34% above the previous 5-year (1989-1993) average (Appendix A3). This harvest accounted for approximately 14% of the total chinook salmon harvest from NCIMA waters during 1994 (Table 7 and Appendix A3). Harvest rates during 1995, based on reports from anglers and guides, were lower than 1994.

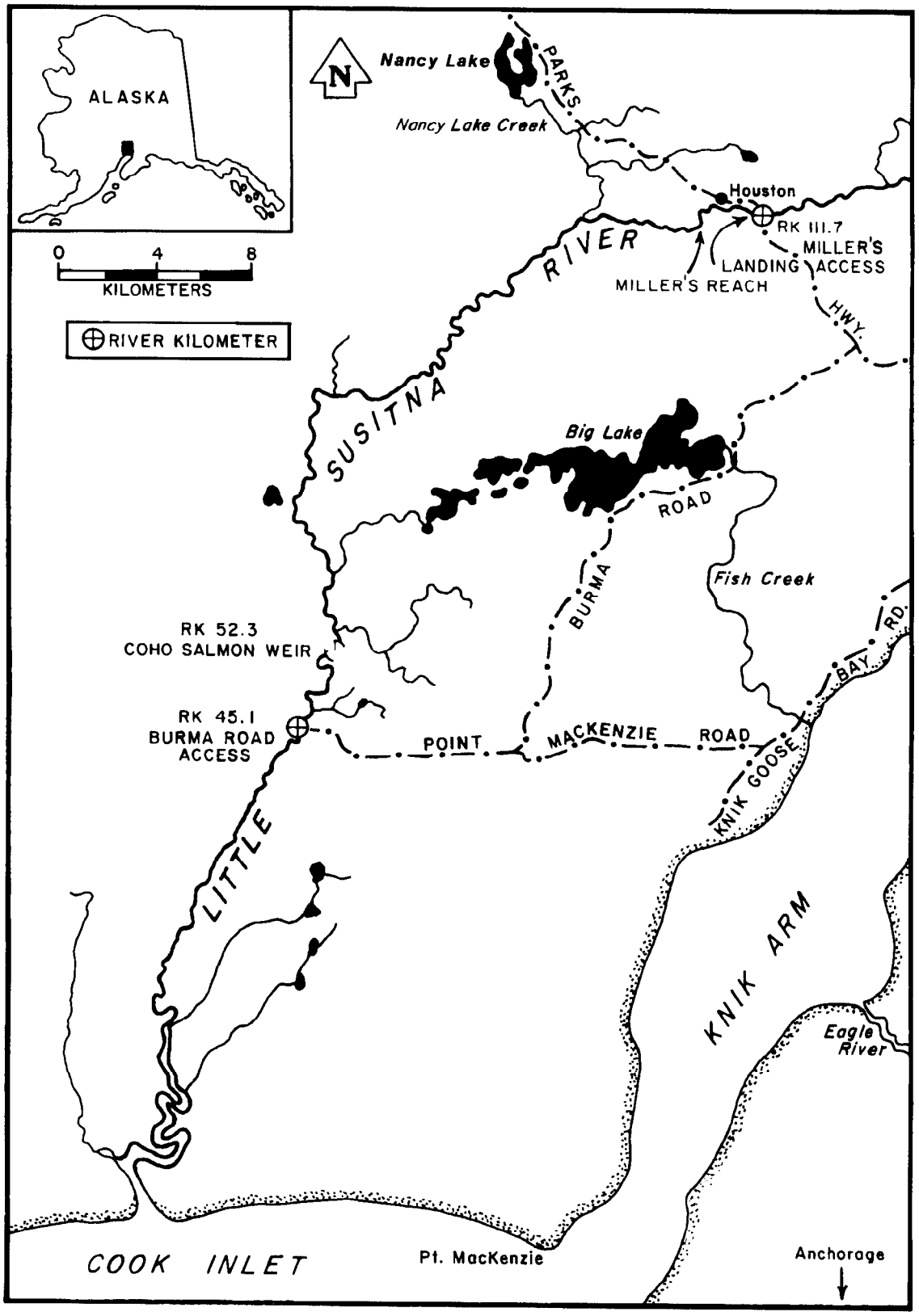

Figure 12.-Map of the Little Susitna River.

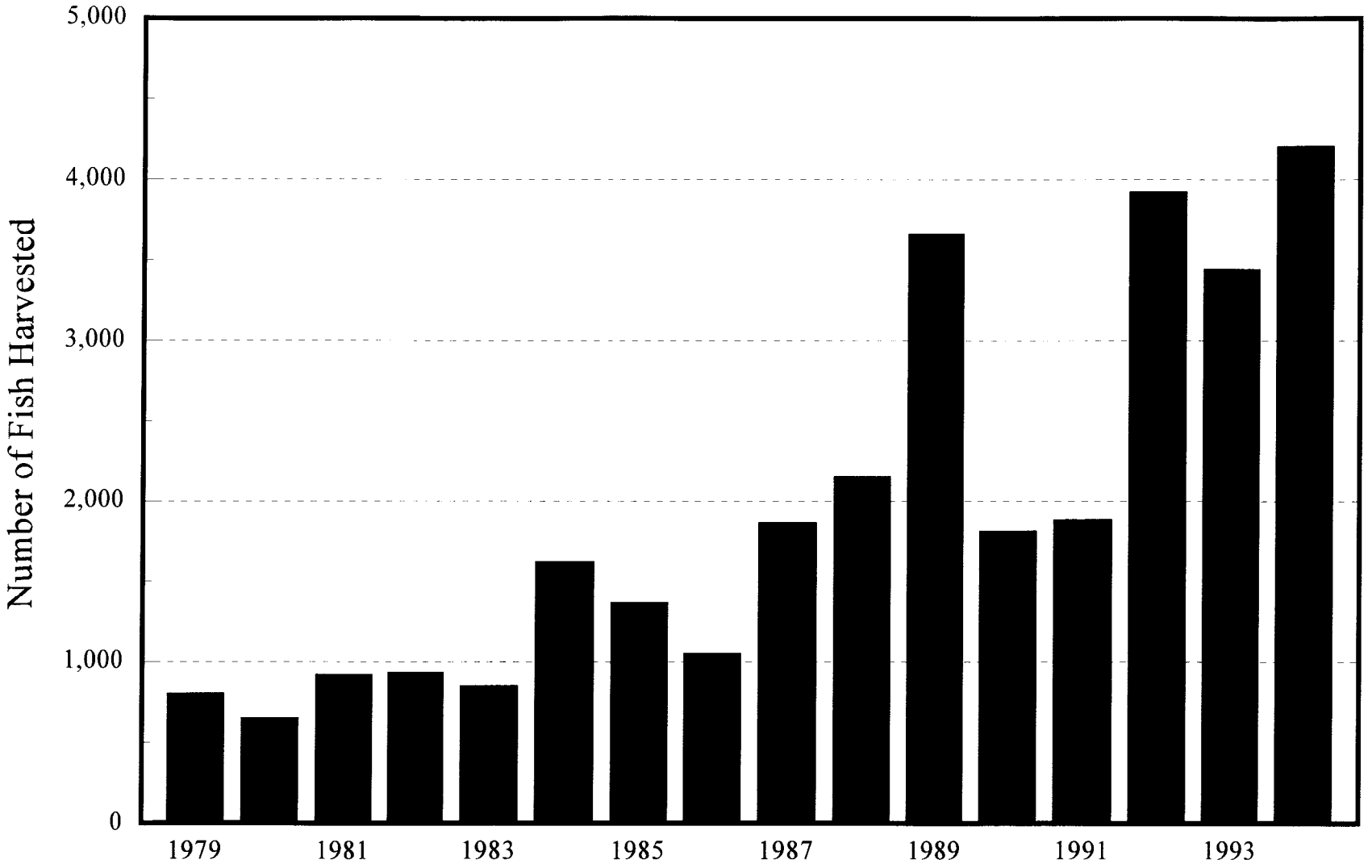

Figure 13.-Little Susitna River chinook salmon harvest, 1979-1994.

Table 22.-West Cook Inlet and Knik Arm management units chinook salmon escapement index counts, 1979-1995.

	West Cook Inlet[a]					Knik Arm[a]	
	Chuitna	Theodore	Lewis	Other	Total	Little Susitna River	
Year	River	River	River	Streams[c]	WCI	Weir	Aerial
1979	1,246	512	546	236	2,540		nc[b]
1980[b]							nc[b]
1981	1,362	535	560	1,144	3,601		nc[b]
1982	3,438	1,368	606	1,972	7,384		nc[b]
1983	4,043	1,519	nc	nc[b]	5,562		929
1984	2,845	1,251	947	nc[b]	5,043		558
1985	1,600	1,458	861	700	4,619		1,005
1986	3,946	1,281	722	165	6,114		nc[b]
1987	nc[b]	1,548	875	nc[b]	2,423		1,386
1988	3,024	1,906	616	nc[b]	5,546	7,400[d]	3,197
1989	990	1,026	452	nc[b]	2,468	4,367[d]	nc[b]
1990	480	642	207	nc[b]	1,329		922
1991	537	508	303	nc[b]	1,348		892
1992	1,337	1,053	445	nc[b]	2,835		1,441
1993	2,085	1,110	531	156	3,882		nc[b]
1994	1,012	577	164	368	2,121	2,981[d]	1,221
1995	1,162	694	146	221[e]	2,223	2,809[d]	1,714
BEG[f]	1,400	750	400	2,550	850		

[a] Aerial count unless otherwise indicated.

[b] No count conducted, turbid water.

[c] May include Olsen, Nikoli, Coal, Straight, Bishop, Drill, and Scarp creeks.

[d] Weir count.

[e] Coal creek.

[f] Biological escapement goal.

Aerial survey evaluation of the chinook salmon spawning escapement in 1995 resulted in a count of 1,714 fish (Table 22), which exceeded the established BEG of 850 fish.

During the spring of 1994 and 1995 a weir was placed in the Little Susitna River to collect biological information and count returning adult chinook salmon (Tables 22 and 23). Weir counts were 2,981 and 2,809 in 1994 and 1995, respectively. In 1988, 1994 and 1995 both aerial and weir counts were conducted. The aerial count results were 43%, 41% and 61% of the weir counts, respectively (Table 22).

Management Objectives

The estimated escapement which produces the greatest yield, the biological escapement goal (BEG), was set at 850 fish as assessed by aerial survey for the Little Susitna River (Table 24). The BEG is based on the average historical aerial survey index counts of spawning chinook salmon. The management objective is to maximize fishing opportunity while insuring a spawning population of 850 chinook salmon as indexed by aerial survey. In 1988, 1989 and 1994, years in which a weir program was conducted and harvest estimates are available, inriver exploitation rates were estimated at approximately 28%, 49% and 59%, respectively. This indicates an increasing rate of harvest that may possibly lead to stock conservation problems.

Recent Board of Fisheries Action

During the November 1992 BOF meeting no specific action was taken regarding the Little Susitna River chinook salmon fishery, however, the areawide regulations described in the NCIMA chinook salmon fishery overview section apply to the Little Susitna River. These include: (1) five chinook salmon seasonal limit for all waters of Cook Inlet, and (2) guides may not participate or engage in sport fishing while clients are present. Additionally, due to legislative action, a king salmon stamp is required to be in the possession of chinook salmon anglers.

During an October 1994 meeting the BOF delegated authority to restrict chinook salmon harvests in Northern Cook Inlet to the Commissioner of the ADF&G in order to address stock conservation concerns. Additional restrictions implemented by the ADF&G for the 1995 season were: (1) a possession limit of one chinook salmon over 16 inches in length, (2) prohibition of the use of bait during chinook salmon season, and (3) reduced recreational fishing time during chinook salmon season to the hours of 6:00 a.m. through 11:00 p.m.

The next BOF meeting concerning the Little Susitna River is scheduled for February 1996.

Current Issues

There are several issues confronting the fishery resources of the Little Susitna River and the users of these resources. These issues include: (1) inclusion of the Little Susitna River as one of six rivers in the Recreation River Act, (2) extension of the South Big Lake Road to the Little Susitna River at river mile 39.5, (3) use restrictions associated with habitat issues such as streambank erosion within the State Game Refuge, and (4) fee increases for the Little Susitna Public Use Facility.

A discussion of the Recreation Rivers Act and use restrictions within the State Game Refuge is included in Section I of this report. A discussion of the South Big Lake Road extension is provided in Whitmore et al. 1993.

Table 23.-Sex and age composition and length-at-age of chinook salmon sampled from Willow, Clear, Alexander and Lake creeks sport harvests and Deshka and Little Susitna rivers weirs, 1995.

	Willow Creek[a]				Clear Creek[a]				Lake Creek[a]				Alexander Creek[a]				Deshka River Weir[a]				Little Susitna Weir[a]			
	1.2	1.3	1.4	1.5	1.2	1.3	1.4	1.5	1.2	1.3	1.4	1.5	1.2	1.3	1.4	1.5	1.2	1.3	1.4	1.5	1.2	1.3	1.4	1.5
Male																								
Percent	16.7	9.6	22.3	0.8	17.1	13.7	20.1	1.7	11.5	14.9	16.8	0	20.9	24.1	13.2	0.5	27.8	14.8	13.3	0.6	21.7	10.5	14.3	0.8
SE	2.4	1.9	2.6	0.6	2.5	2.3	2.6	0.9	2.2	2.5	2.6		2.8	2.9	2.3	0.5	2.4	1.9	1.9	0.4	1.9	1.4	1.6	0.4
Mean Length (mm)	629	795	979	1,025	618	868	995	1,078	606	813	999		594	810	923	1,000	564	801	936	950	587	843	985	1,020
SE	7.2	18.9	10.1	60	9.9	10.8	9.7	25.2	11.2	11.4	10.4		8.1	10.7	13.1		4.8	12.5	9.3	50.0	6.4	9.8	8.6	35.4
Sample Size	42	24	56	2	40	32	47	4	24	31	35	0	46	53	29	1	94	49	45	2	105	50	69	4
Female																								
Percent	0.4	14.3	34.3	1.2	0.4	12.4	31.2	1.7	0	13.0	38.0	2.4	0.5	15.0	21.4	1.8	10.1	14.2	17.2	0.9	0.4	12.8	35.1	2.7
SE	0.4	2.2	3.0	0.7	0.4	2.2	3.0	0.9		2.3	3.4	1.1	0.5	2.4	2.8	0.9	1.6	1.9	2.1	0.5	0.3	1.5	2.2	0.7
Mean Length (mm)	680	846	922	1,037	600	862	948	1,010		854	942	991	655	817	898	935	593	786	888	880	585	851	929	954
SE		7.1	5.8	35.3		8.5	4.9	29.7		8.2	5.6	19.1		9.6	9.6	29.0	7.6	8.8	5.8	30.6	85.0	7.4	3.7	15.5
Sample Size	1	36	86	3	1	29	73	4	0	27	79	5	1	33	47	4	34	48	58	3	2	62	170	13
Combined																								
Percent	17.1	23.9	56.6	2.0	17.5	26.1	51.3	3.4	11.5	27.9	54.8	2.4	21.4	39.1	34.5	2.3	37.9	29.0	30.5	1.5	22.1	23.3	49.4	3.5
SE	2.4	2.7	3.1	0.9	2.5	2.9	3.3	1.2	2.2	3.1	3.5	1.1	2.8	3.3	3.2	1.0	2.6	2.5	2.5	0.7	1.9	1.9	2.3	0.8
Mean Length (mm)	630	825	944	1,032	617	865	966	1,044	606	832	960	991	595	813	908	948	571	793	909	908	587	848	945	970
SE	7.1	9.2	5.8	27.2	9.7	6.9	5.2	22.1	11.2	7.6	5.6	19.1	8.0	7.5	7.8	26.0	4.2	7.7	5.7	28.7	6.4	6.0	4.0	15.4
Sample Size	43	60	142	5	41	61	120	8	24	58	114	5	47	86	76	5	128	97	103	5	107	112	239	17
Total Percent Male (SE)	49.8 (3.2)				54.3 (3.3)				46.6 (3.5)				60.9 (3.3)				57.7 (2.7)				49.0(2.3)			
Total Percent Female (SE)	50.2 (3.2)				45.7 (3.3)				53.4 (3.5)				39.1 (3.3)				42.3 (2.7)				51.0 (2.3)			
Total Sample Size	251				234				208				220				338				484			

[a] Less than 5% of the population consists of age classes other than those listed.

Table 24.-Chinook salmon biological escapement goals (BEG) for Northern Cook Inlet Management Area waters.

Drainage	BEG	Method of Survey
Knik Arm Management Unit		
Little Susitna River	850	Aerial
Eastside Susitna River Management Unit		
Chulitna River	2,000	Aerial
Clear Creek	1,300	Aerial
Goose Creek	350	Aerial
Little Willow Creek	650	Aerial
Montana Creek	1,100	Aerial
Prairie Creek	4,700	Aerial
Sheep Creek	650	Aerial
Willow Creek	1,750	Aerial
Westside Susitna River Management Unit		
Alexander Creek	2,700	Aerial
Deshka River	11,200	Aerial
Lake Creek	2,900	Aerial
Peters Creek	1,300	Aerial
Talachulitna River	2,700	Aerial
West Cook Inlet Management Unit		
Chuitna River	1,400	Aerial
Lewis River	400	Aerial
Theodore River	750	Aerial

Amendments have been made to the regulations establishing user fees in the Little Susitna Public Use Facility. The regulation changes were based upon suggestions developed with the assistance of a citizens advisory group during the course of several public meetings. Increases in user fees were proposed because of the need to recover the cost of maintaining the facility.

There is a trend of increasing chinook salmon harvest in the Little Susitna River. The 1992 and 1993 harvests were the second and third largest on record with the 1994 harvest equaling the largest recorded harvest. Implementation of the areawide restrictive regulations that apply to this system will stabilize harvest levels and prevent an increase in the Little Susitna River chinook salmon harvest.

Ongoing Research and Management Activities

During the spring of 1994 and 1995 a weir was placed in the Little Susitna River to collect biological information and count returning adult chinook salmon (Tables 22 and 23). Excluding 1988, 1989, 1994 and 1995 when a weir was in place, only aerial surveys were conducted annually to index numbers of spawning chinook salmon. In 1988, 1994 and 1995 both aerial and weir counts were conducted. The aerial count results were 43%, 41% and 61% of the weir counts, respectively (Table 22). These weir counts have increased understanding of the relationship between aerial surveys and total run size and have provided information which may be used inseason to modify fishing regulations in order to achieve an appropriate escapement level.

Recommended Research and Management Activities

Managers are concerned with the status of Little Susitna River chinook salmon. To insure the BEG is achieved, the department recommends chinook salmon fishing restrictions similar to those initiated in 1995 remain in effect during the 1996 chinook season. They are: (1) a possession limit of one chinook salmon over 16 inches in length, (2) prohibition of the use of bait during chinook salmon season, and (3) limit recreational fishing time during chinook salmon season to the hours of 6:00 a.m. through 11:00 p.m.

Aerial surveys will be continued to index numbers of spawning chinook salmon. The weir to count chinook salmon and collect biological information will not be operated in 1996.

Increased enforcement is recommended to ensure compliance of established chinook salmon fishery regulations.

Eastside Susitna Management Unit Chinook Salmon Fisheries

Background and Historical Perspective

The Eastside Susitna Management Unit includes all drainages of the Susitna River downstream of the Oshetna River to the confluence of the Chulitna River and drainages which flow into the Chulitna River from the east and those drainages which flow into the Susitna River from the east between the Talkeetna and Deshka rivers (Figure 14). The Eastside Susitna Management Unit is composed of three distinct geographical areas in which different regulations are in effect. These areas include: (1) the eastside Susitna River tributaries between the Deshka and Talkeetna rivers, (2) the Talkeetna River, and (3) the upper Susitna area which includes the Susitna River and all tributaries upstream of the confluence with the Chulitna River to the Oshetna River.

Many clearwater tributaries enter the Susitna River from the east between its junction with the Deshka River upstream to the Talkeetna River. This portion of the management unit is

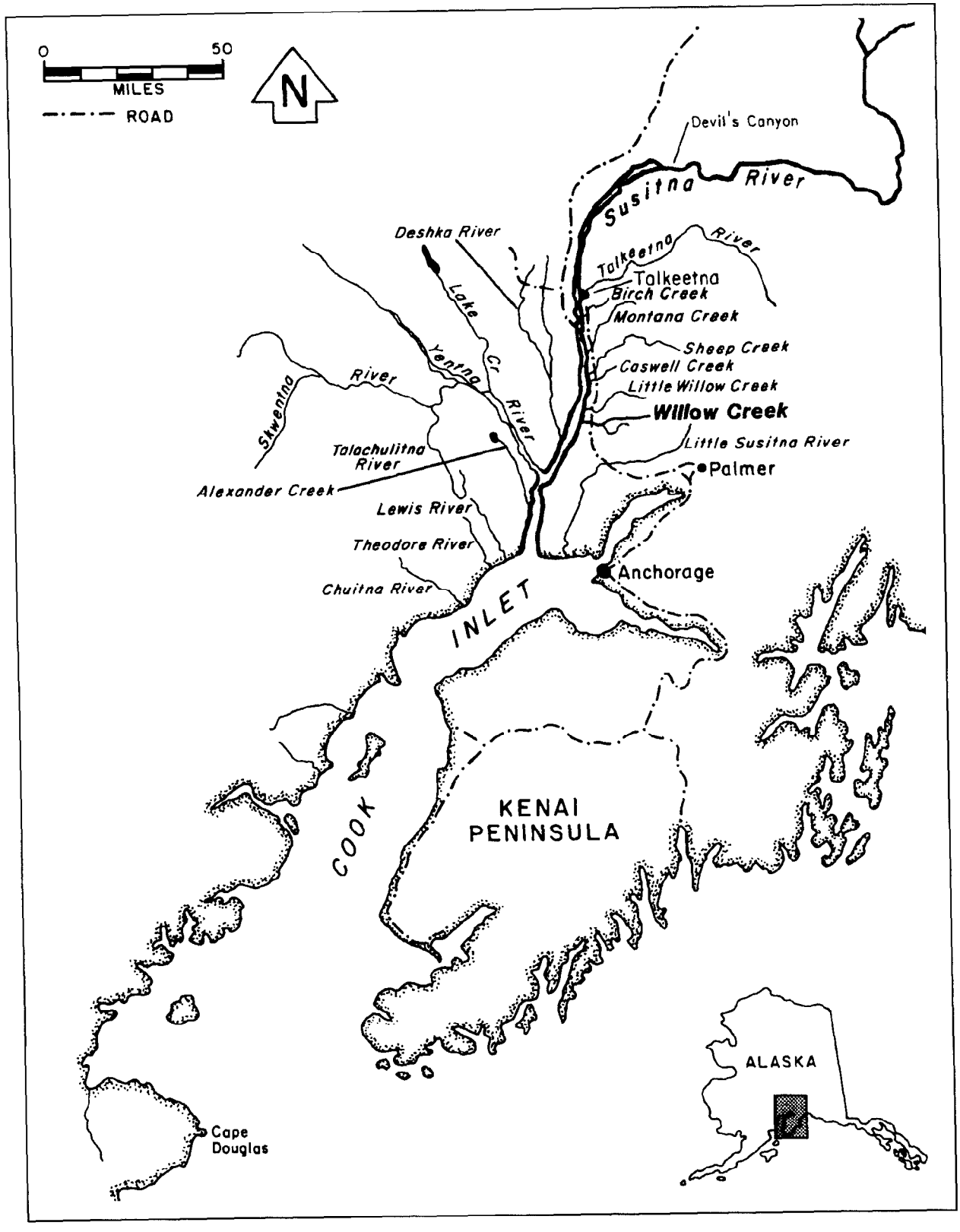

Figure 14.-Map of Northern Cook Inlet area.

accessible by paved road. The George Parks Highway (Alaska Route 1) parallels the Susitna River on the east en route to connecting Anchorage and Fairbanks. The Alaska Railroad also parallels the east side of the Susitna River to a large extent. Both transportation systems provide angler access to numerous tributaries. Waters of this area within one-quarter mile of the Susitna River (except Willow Creek) are open to chinook salmon fishing each Saturday, Sunday and Monday for four consecutive weeks beginning the second Saturday in June. Major fisheries occur in Little Willow, Caswell, Sheep, Goose and Montana creeks (Figure 15). Each of these fisheries extend from the Susitna River upstream to the George Parks Highway except Montana Creek which extends 1 mile upstream of the Alaska Railroad bridge. Willow Creek is open to chinook salmon fishing from January 1 through the third Monday in June and then reopens on a Saturday through Monday basis for 2 consecutive weeks beginning the fourth Saturday in June. In addition, waters within a one-quarter mile radius of the Susitna River and the mouths of Sunshine and Birch Creek plus numerous small sloughs and creeks are open to chinook salmon fishing on a Saturday through Monday basis for 4 consecutive weeks starting the second Saturday in June.

The Talkeetna River joins the Susitna River about 98 miles upstream from Cook Inlet. This glacial system contains two major and numerous minor clearwater tributaries that support chinook salmon (Figure 16). Clear Creek is the most prominent chinook fishery within the Talkeetna River drainage. The Talkeetna Spur Road provides access to the Talkeetna River, however, a boat is required to reach virtually all chinook salmon fisheries within the drainage. This area is primarily accessed from the Talkeetna boat launch.

The Talkeetna River and upper Susitna River drainages are open to chinook salmon fishing from January 1 through July 13. The upper Susitna River area (Talkeetna to Devil's Canyon) is accessible only by boat or railroad. A public boat launch adjacent to the community of Talkeetna provides access to the area. Boat travel is relatively safe from the Talkeetna River upstream to the entrance of Devil's Canyon, a distance of about 55 miles. Boat travel beyond the entrance to Devil's Canyon is extremely hazardous and few boat operators ever venture past this location. Indian River and Portage Creek are the most prominent chinook salmon fisheries within the Upper Susitna River Area. The entrance to Devil's Canyon beyond which salmon can not migrate, is about 150 miles upstream from Cook Inlet. The portion of the Susitna River above the Talkeetna River is designated as a trophy fishery for rainbow trout, therefore only unbaited, single-hook artificial lures are permitted as terminal gear.

Through 1994 the bag and possession limits for chinook salmon in all Eastside Susitna Management Unit fisheries was one chinook salmon per day and two in possession, 16 inches or more in length. The bag and possession limit for chinook salmon under 16 inches in length is 10 per day and in possession. Regulations governing eastside Susitna River fisheries since chinook salmon fishing reopened in 1979 are described in Appendix E.

During 1987 to 1993, the Eastside Susitna Management Unit fisheries have collectively provided 27%-48% of the chinook salmon harvest from the NCIMA. The harvest has ranged from 8,603 to 22,688 during the period 1987-1994 (Table 25). Included in this harvest are hatchery fish taken in Willow Creek, which totaled approximately 4,000 fish in both 1992 and 1993. With the hatchery fish harvest discounted during 1992 and 1993 the remaining harvest for this time period nearly doubled all previous years (Appendix A4).

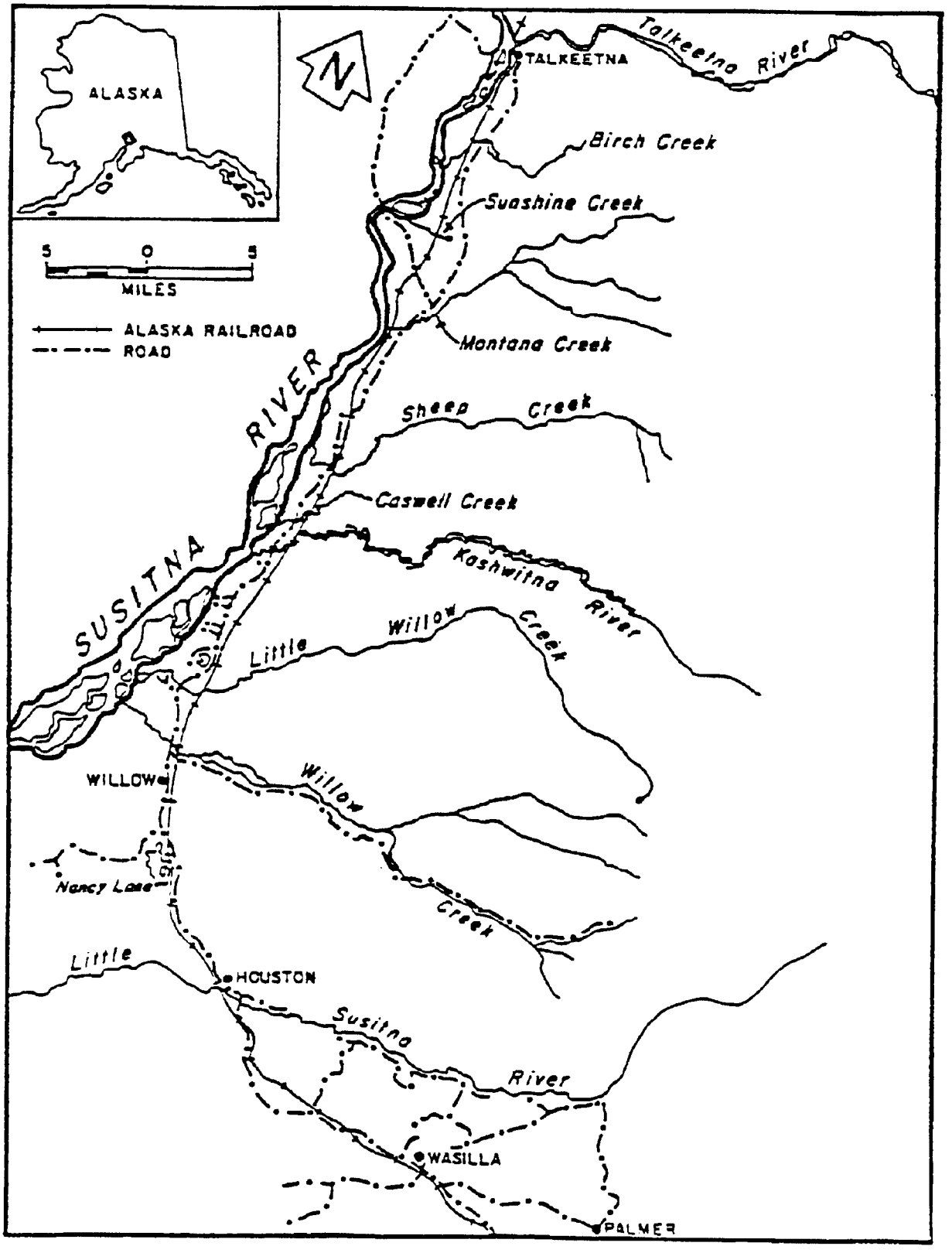

Figure 15.-Map of eastside tributaries of the Susitna River.

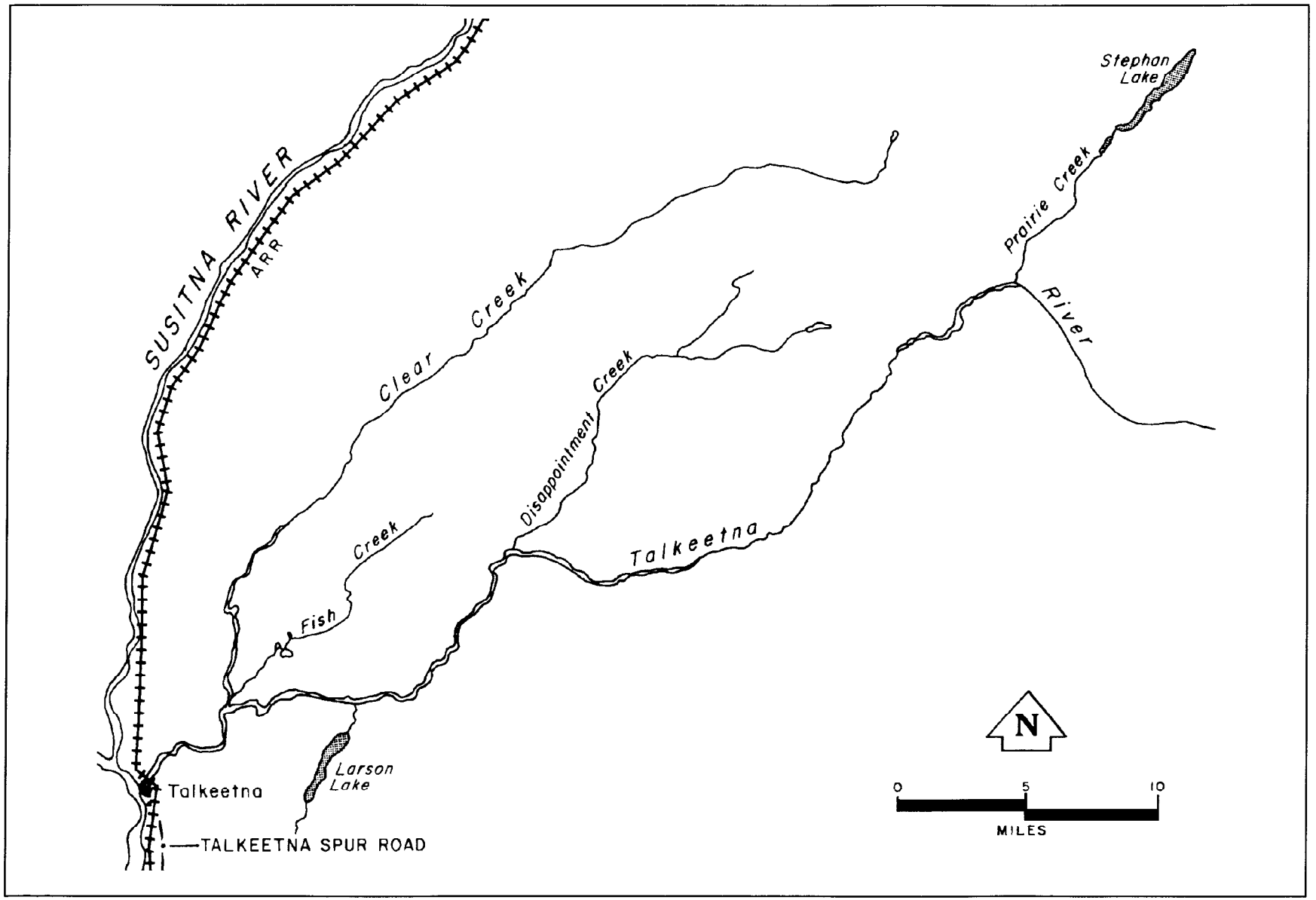

Figure 16.-Map of the Talkeetna River area.

Table 25.-Harvest of chinook salmon from eastside Susitna River, westside Susitna River, West Cook Inlet and Knik Arm drainages, 1979-1994.

	Eastside Susitna River						
Year	Hatchery	Non-hatchery	Total	Westside Susitna River	West Cook Inlet	Knik Arm	Total
1979			1,298	5,768	98	800	7,964
1980			1,370	6,148	34	646	8,198
1981			2,202	4,742	192	1,466	8,602
1982			2,063	8,573	147	1,666	12,449
1983			2,852	9,569	1,185	1,255	14,860
1984			4,428	13,402	1,833	2,057	20,424
1985			4,342	12,106	2,029	1,889	21,904
1986			8,569	13,644	2,378	1,524	25,873
1987			8,603	13,350	1,477	2,476	25,906
1988	355	8,784	9,139	15,970	1,695	2,916	29,720
1989	1,079	8,704	9,783	19,343	2,325	4,341	35,792
1990	1,194	8,229	9,423	17,425	2,097	2,022	30,967
1991	844	8,239	9,083	21,836	762	2,277	33,958
1992	4,566	16,741	21,307	18,737	1,213	3,969	45,226
1993	3,977	18,711	22,688	21,142	1,855	3,602	49,287
1994	2,703	12,267	14,970	10,248	1,577	4,303	31,098

Aerial survey escapement counts of Eastside Susitna Management Unit chinook salmon stocks suggest that these substocks comprise from 30% to 60% of the Susitna River chinook salmon escapement (Tables 26 and 27). Prairie Creek, a headwater tributary of the Talkeetna River, consistently receives the largest escapement which has ranged between 2,254 and 9,463 from 1987 through 1995 (Table 26).

Willow Creek, Talkeetna River, Sheep Creek and Montana Creek traditionally produce the largest harvest of chinook salmon in the Eastside Susitna Management Unit. Between 1987 and 1993 the average annual harvest for these fisheries was 4,448, 2,603, 1,799 and 1,813, respectively (Appendix A4). Tagging studies have shown that these chinook salmon substocks are subject to harvest at stream mouths other than their natal stream (Peltz and Sweet 1992). Therefore, stocks from the upper portions of the drainage such as Prairie Creek, are harvested at stream mouths along their migration corridor. The magnitude of nonnatal stream harvest has not been defined.

Few chinook salmon arrive at the mouths of Eastside Susitna Management Unit tributaries between the Deshka and Talkeetna rivers prior to mid-June. The third and fourth weekends in June generally provide the majority of the harvest. Very few chinook salmon arrive at the Talkeetna River prior to June 20. The Talkeetna River harvest peaks during the first week in July. The Upper Susitna River fishery has a run timing similar to that of the Talkeetna River.

Creel surveys were employed from 1979-1989 to monitor the effort for and harvest of chinook salmon at Willow Creek, Montana Creek and the Talkeetna River. Creel surveys were continued annually on Willow Creek; and in 1991, 1992 and 1995 for the Talkeetna River. Biological samples were collected from the Talkeetna River during the 1993 and 1994 seasons. No harvest estimates were collected during this time. Creel surveys were intermittently conducted at Sheep, Goose, Caswell, Little Willow, Sunshine, and Birch creeks and within the upper Susitna River area. Findings from these surveys have been documented in the Department of Fish and Game's annual Federal Aid in Fish Restoration reports (Watsjold 1980, 1981; Bentz 1982, 1983; Hepler and Bentz 1984-1987, Hepler et al. 1988 and 1989, Sweet and Webster 1990, Sweet et al. 1991, Peltz and Sweet 1992 and 1993, Sweet and Peltz 1994).

Willow Creek was identified in 1981 as a candidate for chinook salmon stocking in the Cook Inlet Regional Salmon Enhancement Plan. A chinook salmon smolt stocking program was initiated in 1985, and with the exception of 1987, the program has continued annually (Table 28). The goals of this program are to: (1) maintain the present quality and quantity of natural chinook salmon production, (2) produce through supplemental hatchery production an additional 6,000 returning chinook salmon of which 4,000 would be available for harvest at Willow Creek on an annual basis by 1994, and (3) provide a minimum of 15,000 angler-days of chinook salmon fishing opportunity during the period 10 June to 10 July (Sweet and Peltz 1994).

Recent Fishery Performance

The 1994 harvest from the Eastside Susitna Management Unit was 14,970 fish (Table 9 and Appendix A4), a decrease from the previous two years. This harvest represented approximately 48% of the entire chinook salmon harvest from the NCIMA (Tables 7 and 9). In total, 23,985 chinook salmon were caught in the Eastside Susitna Management Unit during 1994 of which

Table 26.-Eastside Susitna River Management Unit chinook salmon escapement index counts, 1979-1995.

Year	Willow Creek	Deception Creek	Little Willow	Sheep Creek	Goose Creek	Montana Creek	Clear Creek	Prairie Creek	Chulitna River	Portage Creek	Indian River	Kashwitna River	Other Streams[b]	Total
1979	848	239	327	778	nc[a]	1,094	864	nc[a]	nc[a]	190	285	457	nc[a]	5,082
1980[a]														
1981	991	366	459	1,013	262	814	nc[a]	1,875	nc[a]	659	422	558	nc[a]	7,419
1982	592	229	316	527	140	887	982	3,844	863	1,111	1,053	156	268	10,986
1983	777	121	1,042	975	477	1,641	938	3,200	4,058	3,140	1,193	297	nc[a]	17,859
1984	2,789	675	nc[a]	1,028	258	2,309	1,520	9,000	4,191	2,341	1,456	111	nc[a]	25,678
1985	1,856	1,044	1,305	1,634	401	1,767	2,430	6,500	783	--[c]	--[c]	457	4,066	22,243
1986	2,059	521	2,133	1,285	nc[a]	nc[a]	nc[a]	8,500	nc[a]	nc[a]	nc[a]	700	nc[a]	15,198
1987	2,768	692	1,320	895	416	1,320	nc[a]	9,138	5,252	2,616	1,246	872	nc[a]	26,535
1988	2,496	790	1,515	1,215	1,076	2,016	4,850	9,280	nc[a]	1,402	456	1,159	nc[a]	26,255
1989	5,060	800	1,325	610	835	2,701	nc[a]	9,463	nc[a]	1,309	659	355	nc[a]	23,117
1990	2,365	700	1,115	634	552	1,576	2,380	9,113	2,681	1,886	1,473	872	nc[a]	25,347
1991	2,006	747	498	154[d]	968	1,605	1,974	6,770	4,410	1,223	1,468	340	nc[a]	22,163
1992	1,660	983	673	nc[a]	369	1,560	1,530	4,453	2,527	1,078	479	470	nc[a]	15,782
1993	2,227	1,221	705	nc[a]	347	1,218	886	3,023	2,070	629	362	525	nc[a]	13,213
1994	1,479	766	712	542	375	1,143	1,204	2,254	1,806	857	336	430	nc[a]	11,904
1995	3,792	834	1,210	1,049	374	2,110	1,928	3,884	3,460	1,505	796	836	nc[a]	21,778
BEG[e]	1,750		650	650	350	1,100	1,300	4,700	2,000					

[a] No counts conducted.

[b] May include Honolulu, Byers, Troublesome, Bunco, Birch, Sunshine, Larson creeks.

[c] Included with other streams.

[d] Poor count due to timing, poor visibility or weather conditions.

[e] Biological escapement goal.

Table 27.-Westside Susitna River Management Unit chinook salmon escapement index counts, 1979-1995.

Year	Alexander Creek	Deshka River	Peters Creek	Lake Creek	Talachulitna River	Cache Creek	Other Streams[b]	Total
1979	6,215	27,385	108	4,196	1,648	nc[a]	nc[a]	39,552
1980[a]								
1981	nc[a]	nc[a]	nc[a]	nc[a]	2,025	nc[a]	nc[a]	2,025
1982	2,546	16,000	nc[a]	3,577	3,101	nc[a]	nc[a]	25,224
1983	3,755	19,237	2,272	7,075	10,014	497	nc[a]	42,850
1984	4,620	16,892	324	nc[a]	6,138	nc[a]	nc[a]	27,974
1985	6,241	18,151	2,901	5,803	5,145	206	485	38,932
1986	5,225	21,080	1,915	nc[a]	3,686	424	nc[a]	32,330
1987	2,152	15,028	1,302	4,898	nc[a]	556	nc[a]	23,936
1988	6,273	19,200	3,927	6,633	4,112	818	nc[a]	40,963
1989	3,497	nc[a]	959	nc[a]	nc[a]	362	nc[a]	4,818
1990	2,596	18,166	2,027	2,075	2,694	484	nc[a]	28,042
1991	2,727	8,112[c]	2,458	3,011	2,457	499	161	19,425
1992	3,710	7,736	996	2,322	3,648	487	nc[a]	18,899
1993	2,763	5,769	1,668	2,869	3,269	1,690	nc[a]	18,028
1994	1,514	2,665	573	1,898	1,575	628	570	9,421
1995	2,090	4,156 10,048[d]	1,041	3,017	2,521	1,601	408	14,834
BEG[e]	2,700	11,200	1,300	2,900	2,700			

[a] No count conducted.

[b] May include Donkey Creek, Red Creek and other miscellaneous creeks.

[c] Low count due to timing, poor visibility or weather conditions.

[d] Weir count.

[e] Biological escapement goal.

Table 28.-Number of chinook salmon smolt stocked into the Willow Creek drainage from 1985-1995.

Brood Year	Release Location	Total Smolt Release	Number Coded-wire Tagged	Mean Size	Release Date
1983	Deception	101,256	8,152	18.0	6/13/85
1984	Deception	214,384	11,038	13.8	6/11-12/85
	Deception	218,743	10,708	14.0	6/20/85
1985	Deception	49,668	9,933	16.7	5/01/86
	Deception	127,904	18,400	12.2	5/10/86
	Deception	147,877		11.4	5/10/86
		275,781	18,400		
1987	Deception	201,091	20,936	10.9	7/12/88
1988	Deception	240,885	19,851	13.0	5/31/89
1989	Deception	219,362	41,570	14.4	5/24/90
	Deception	219,432	40,575	13.4	5/24/90
	Deception	216,697	40,438	13.9	5/24/90
		655,491	122,583		
1990	Deception	168,777		11.2	5/21/91
	Deception	70,258	31,167	12.3	5/31/91
	Willow	73,756		12.3	5/28/91
	Willow	78,878	31,167	12.3	5/30/91
		391,669	62,334		
1991	Deception	179,724	33,464	13.5	5/29/92
	Deception	35,752		14.5	6/09/92
		215,476	33,464		
1992	Deception	160,194	39,626	14.9	6/01/93
1993	Deception	177,913	46,289	13.3	5/24-25/94
1994	Deception	184,740	46,807	13.5	5/25/95

38% were released (Table 13). The harvest estimate for 1994 includes approximately 2,700 hatchery fish taken in the Willow Creek fishery. There was a corresponding decrease in angler effort in 1994, 114,533 angler-days, down from 128,382 in 1993 but still greater than all years prior to 1992 (Table 1).

During 1994 the harvest of chinook salmon from Willow Creek, Talkeetna River, and Montana Creek was 5,980 (approximately 2,700 hatchery produced), 2,144 and 3,111 fish, respectively (Appendix A4). The harvest from these three drainages accounted for 75% of the chinook salmon harvest from the Eastside Susitna Management Unit during 1994.

A creel and escapement survey to estimate harvest and effort and the relative contribution of hatchery-produced chinook salmon to the sport harvest and escapement was conducted at the mouth of Willow Creek in 1995. This inseason harvest survey was performed to determine what effect more restrictive regulations for the 1995 season had on the chinook harvest level. Survey results produced harvest and catch estimates of 1,791 and 2,424 chinook salmon, respectively, with a corresponding angler effort of 25,896 angler-hours. The Willow Creek SWHS estimated harvest represents the entire area open to fishing which includes the mouth area and the upriver area. Past comparison of inseason creel survey and SWHS data has shown the mouth fishery harvest to be about 70% of the entire fishery. This results in an estimated total fishery harvest of approximately 2,700 fish for 1995. This estimated 1995 harvest is approximately one half of the 1994 harvest, indicating the 1995 regulation changes produced the desired effect. Escapement index counts in 1995 indicated a minimum of 4,626 spawners in Willow and Deception creeks combined, the second highest count recorded since 1979 (Table 26). This high escapement count would be expected considering the low harvest level indicated in the fishery. During 1995 hatchery fish accounted for 41% of the harvest, 22% of the escapement in the mainstem of Willow Creek above the confluence of Deception Creek, and 47% of the Deception Creek escapement. The 1989-1994 sport harvest hatchery contributions averaged 41%. In association with this project the age, sex and size composition of the harvest was determined (Table 23). Males accounted for about 50% of the harvest. Approximately 17% of the harvest was composed of 4 year olds (2-ocean jacks), and age 5, 6, and 7 fish composed 24%, 57%, and 2% of the harvest, respectively.

Following the 1996 season a detailed summary of the performance of the chinook salmon enhancement program in Willow Creek will be written.

During 1995 an inseason creel survey to estimate angler effort and harvest of chinook salmon was conducted at Clear Creek, the primary chinook salmon sport fishing stream in the Talkeetna River drainage. An estimated harvest and catch of 1,516 and 2,268 chinook salmon, respectively, and 22,307 angler hours of effort resulted. Based on the 1994 SWHS harvest estimate of 2,144, the increased restrictions in 1995 resulted in an approximately 30% decrease in harvest. Age, sex, and size data were also collected from the harvest. Males accounted for approximately 54% of the sample. Age 4, 5, 6 and 7 fish accounted for 18%, 26%, 51% and 3% of the harvest, respectively (Table 23).

The 1995 escapement indices for Eastside Susitna Management Unit chinook salmon totaled over 20,000 fish for the first time since 1991 (Table 26). All indices increased over the 1994 counts and only Prairie Creek (a Talkeetna River tributary) failed to reach its BEG in 1995 (Tables 24 and 26). It is believed that the more restrictive regulations for 1995 were mainly

responsible for this increase in spawning escapement by reducing the harvest in all chinook fisheries.

Management Objectives

Biological escapement goals for eight Eastside Susitna Management Unit systems have been established (Table 24). These escapement goals were based on historic escapement index counts. The management objective for these eight systems is to achieve the escapement goal within each system. In the weekend-only fisheries which cross the George Parks Highway, management strategies provide maximum levels of sustained chinook salmon fishing opportunity while attaining escapement objectives. Management objectives specific to Willow Creek relative to the chinook salmon enhancement program are to provide 15,000 angler-days of participation and opportunity to harvest an additional 4,000 hatchery produced chinook salmon.

The objective of the regulations established for the 1995 season was to reduce the harvest to half of the 1994 level. Based on results from two inseason creel surveys the 1995 harvest appears to have decreased substantially with a corresponding increase in all eastside Susitna River escapement indices.

In the upper Susitna River area, management strategies are in place to allow for sustained yield of trophy sized rainbow trout. Full utilization of chinook salmon within this area is not a primary objective.

Recent Board of Fisheries Action

During the November 1992 BOF meeting no actions other than those which affect all areawide fisheries were taken regarding Eastside Susitna Management Unit chinook salmon fisheries. These areawide regulation changes include: (1) the seasonal five chinook salmon limit for all waters of Cook Inlet, (2) the prohibition of sport fishing guides from participating or engaging in fishing during the chinook salmon season while clients are present or within the guide's control, and (3) legislative action which prohibits anglers from fishing for chinook salmon without a king salmon stamp.

During an October 1994 meeting the BOF delegated authority to restrict chinook salmon harvests in Northern Cook Inlet to the Commissioner of the ADF&G in order to address stock conservation concerns. Under this authority restrictions implemented by ADF&G for the 1995 season were: (1) a possession limit of one chinook salmon over 16 inches in length, (2) prohibition of the use of bait during chinook salmon season, and (3) limitation of recreational fishing during chinook salmon season to the hours of 6:00 a.m. through 11:00 p.m. (not including that portion of the eastside Susitna River management unit currently open to weekend-only fishing).

The next BOF meeting to include Eastside Susitna Management Unit chinook is scheduled for February 1996.

Current Issues

The primary social issues in the Eastside Susitna Management Unit chinook salmon fisheries are associated with crowding, regulation violations and the Recreation Rivers Act.

The decrease in spawning escapement during the period 1992-1994 is the primary biological issue confronting these fisheries. Of particular concern is the decline in the Prairie Creek spawning escapement. Prairie Creek escapement has been under its objective level since 1992.

Escapement levels for parent years that produced these returns were above escapement objectives. Increased fishing restrictions in 1995 resulted in decreased harvest and effort levels and contributed to an increase in spawning escapement for all surveyed waters in the eastside Susitna unit. Prairie Creek showed improved escapement numbers in 1995 but still failed to reach its BEG. All other waters with established goals obtained their escapement objectives.

Ongoing Research and Management Activities

Research and management activities are currently being directed at development of a responsible chinook salmon stocking program at Willow Creek. Inseason assessment of the biological characteristics of the harvest and hatchery contribution to the harvest and escapement are important components of this investigation. In addition an inseason survey to document age, length and sex of the Talkeetna River chinook salmon harvest at Clear Creek is conducted. To assess the effects of chinook salmon regulations initiated in 1995, and as an inseason management tool, creel surveys to estimate the harvest, effort and catch at Willow and Clear creeks were conducted. Annual assessment of escapement is an ongoing activity associated with the Eastside Susitna Management Unit fisheries. Results from escapement indices in conjunction with harvest data from the SWHS are the primary elements used to manage these fisheries.

With the implementation of the five chinook salmon seasonal bag limit and chinook salmon stamp requirement, managers decided an enforcement program was necessary to insure compliance with the new regulations. During the 1995 season, department personnel inspected anglers' fishing licenses for compliance with regulations.

Recommended Research and Management Activities

Continuation of ongoing research and management programs is recommended.

As in many other NCIMA streams biological escapement goals for chinook salmon were not achieved for Clear Creek during 1993 or 1994, Sheep Creek and Chulitna River during 1994, or Prairie Creek during 1992-1995. To address stock conservation concerns managers now believe there is a need to conserve the escapement that is reaching the streams. Prior to the 1995 season the following regulations were adopted, through the Administrative Procedure Act, to reduce the harvest by approximately half the 1994 level in all NCIMA chinook fisheries. These regulations include: (1) a possession limit of one chinook salmon over 16 inches, (2) prohibition of the use of bait during chinook salmon season, (3) recreational fishing time during the chinook salmon season (May 15 through July 13) limited to the hours of 6:00 a.m. through 11:00 p.m. with the exception of the weekend-only fisheries, and (4) Prairie Creek will be closed to chinook salmon fishing. A similar conservative strategy should remain in effect for the 1996 season. Inseason harvest and effort surveys, in addition to biological data collection, were conducted at Willow and Clear creeks in 1995 in order to evaluate the effects of new regulations on the fisheries. It is recommended that some form of these surveys be continued in 1996 to provide a management tool for inseason fishery evaluation.

Enforcement activities should be continued to maintain contact with anglers and insure compliance with regulations.

Westside Susitna Management Unit Chinook Salmon Fisheries

Background and Historical Perspective

Tributaries that drain into the Susitna River from the west (Figure 14) supported the largest chinook salmon fisheries within the NCIMA through 1991. Access to the relatively remote

fisheries in this area is primarily by boat or aircraft. Susitna Landing, located at the mouth of the Kashwitna River, and Deshka Landing, located about 4 miles upstream from the Deshka River, are the principal boat access sites on the Susitna River. A few anglers also gain access to Westside Susitna Management Unit fisheries by traversing Cook Inlet from the Port of Anchorage. The Petersville Road provides the only vehicular access to this portion of the Susitna River drainage. This road allows access to the upper reaches of the Deshka River and Peters Creek.

The Yentna River, the largest tributary of the Susitna River, is within this management unit. This glacial river joins the Susitna River about 30 miles upstream from Cook Inlet.

The westside Susitna River chinook salmon fisheries supported the greatest harvest of chinook salmon within the NCIMA until the 1992 season when the eastside Susitna River harvest surpassed it (Table 25). This eastside increase was partly due to the Willow Creek enhancement program. Harvest and participation in the westside Susitna River fisheries increased steadily until 1989 when the harvest stabilized at approximately 20,000 fish (Tables 1 and 25 and Appendix A5). The harvest of chinook salmon in westside Susitna River fisheries has ranged from 13,350 to 21,836 and averaged 18,258 during the period 1987-1993 (Table 25). Westside Susitna River tributaries averaged 51% of the annual chinook salmon harvest from the NCIMA during 1987-1993.

The Deshka River, Alexander Creek and Lake Creek have supported the largest chinook salmon fisheries in this management unit (Appendix A5). The collective harvest from these three fisheries during 1993 represents 82% of the annual chinook salmon harvest from the Westside Susitna Management Unit fisheries. Until 1993 when Lake Creek surpassed it, the Deshka River consistently provided the largest chinook salmon harvest within the NCIMA. During the period 1987-1993, the annual Deshka River harvest has ranged from 5,474 to 9,306 and averaged 6,796 chinook salmon.

The peak harvest at the mouth of Alexander Creek (Susitna River mile 10) normally occurs during the first week in June. The harvest at the mouth of the Deshka River (Susitna River mile 40) peaks during mid-June whereas at Lake Creek (64 miles from the mouth of the Susitna River at Yentna River mile 34) the peak harvest usually takes place during the third week in June.

Harvest levels at major westside Susitna River fisheries have increased substantially since 1979. Improved access (as described in Whitmore et al. 1993) and population growth has undoubtedly increased both participation and harvest. However, it is important to recognize that liberalized regulations during 1986 through 1992, when the chinook salmon bag limit in this area was increased to two daily over 16 inches in length (only one over 28 inches) and four in possession (only two over 28 inches), also contributed to expanded use of the area's chinook salmon resources. Regulations governing westside Susitna River fisheries since chinook salmon fishing reopened in 1979 are described in Appendix E.

The chinook salmon fishing season at all westside Susitna River fisheries extends from January 1 through July 13. With the exception of the Deshka and Chulitna rivers, all westside Susitna River tributaries are open to chinook salmon fishing in their entirety. The Deshka River drainage is closed to chinook salmon fishing upstream from the Moose/Kroto Creek fork; and the Chulitna River is closed with the exception of the East Fork drainage, which is within the Eastside Susitna Management Unit. Unbaited, single-hook artificial lures are mandatory within the Talachulitna

River and in a large portion of the Lake Creek drainage. Unbaited, single-hook artificial lures are also required in the Deshka River upstream from the Moose/Kroto Creek fork.

The Deshka River, Alexander Creek, Lake Creek and the Talachulitna River are included in the Recreation River Act.

Commercial services play an important support role in Westside Susitna Management Unit fisheries. Creel surveys in 1989 revealed that 64% of the chinook salmon fishing effort at Lake Creek was supported by some form of commercial service, e.g. fishing guides, lodges, air charter, etc. (Engel and Vincent-Lang 1992). In contrast, commercial services were used by only 14% and 6% of the participants at Alexander Creek and the Deshka River, respectively.

Aerial surveys during the 1990 chinook fishery revealed very light fishing pressure scattered throughout the vast reaches of the Yentna River drainage (Sweet et al. 1991). The distribution and magnitude of this effort did not suggest that any surveyed water was in danger of overharvest because of heavy fishing pressure.

Beginning in 1991 chinook salmon spawning abundance in westside Susitna River tributaries has been below desired levels (Table 27). Chinook salmon escapements to the Deshka River have shown an alarming trend of declining abundance during this period, while the average recreational harvest of chinook salmon during 1990 through 1992 was approximately 40% greater than the average harvest during the previous 10 years (Appendix A5). The escapement goal for the Deshka River of 11,200 fish has not been achieved since 1990 (Tables 24 and 27).

Concern for Susitna River chinook salmon grew during 1992 when harvest rates of commercial and sport fisheries that intercept these stocks reflected that fish abundance was less than desired. An emergency order effective June 22, 1992, reduced the daily bag and possession limit for chinook salmon 16 inches or more in length to one fish in all waters of the Susitna and Little Susitna River drainages. It also required the release of all chinook salmon 16 inches or more in length, and the use of unbaited, artificial lures in all waters of the Deshka River drainage between the Deshka River's confluence with Trapper Creek and the confluence of Moose and Kroto creeks (the Forks); and in all waters of the Alexander Creek drainage upstream from Alexander Creek's confluence with Trail Creek (Appendix D). Growing concern caused the BOF during their 1992 meeting to adopt new regulations for the 1993 chinook salmon season. These regulations included a bag limit of one daily and two in possession, a seasonal five Cook Inlet chinook salmon limit and a requirement that sport fishing guides cannot participate or engage in fishing during the chinook salmon season while clients are present or within their control.

Recent Fishery Performance

The 1994 chinook salmon fishery resulted in a harvest of 10,248 chinook salmon, approximately half the 1993 harvest and the lowest harvest since 1983 (Appendix A5). Harvests from all fisheries decreased in 1994 with the largest decline in the Deshka River which reported only 624 fish harvested (due partly to an inseason closure effective June 17). The harvest of chinook salmon during the 1994 season from Alexander Creek, Lake Creek and Deshka River accounted for 71% of the harvest within the Westside Susitna Management Unit. A total of 12,582 chinook salmon were caught of which 19% were released (Table 14).

In response to a low escapement to the Deshka River in 1993 an emergency order was issued prior to the 1994 season which: (1) prohibited the use of bait throughout the Deshka River

drainage and (2) reduced the possession limit for chinook salmon greater than 16 inches in length to one fish in the Deshka River drainage. In combination with current area-wide regulations, managers believed these actions would reduce the recreational harvest by half in the Deshka River. A low harvest by the Northern District commercial fleet during the early portion of their 1994 season in combination with poor catch rates in the Alexander and Lake creeks recreational fisheries, however, indicated that a low return of chinook salmon to the Susitna River drainage was occurring. In response, an emergency order was issued effective June 17, 1994 which closed the Deshka River to fishing for chinook salmon and prohibited the use of bait in the majority of the Susitna River drainage. In addition, the remaining periods of the Northern District commercial set net fishery were closed.

Aerial survey evaluation of streams in the Westside Susitna Management Unit during 1994 resulted in a fourth consecutive year of reduced chinook salmon abundance (Table 27). BEGs were not achieved within any of the index streams during the 1994 season. This prompted the management strategy outlined previously in the Chinook Salmon Fisheries Management Strategy section. The objective was to decrease the 1995 chinook salmon harvest to half the 1994 level.

During the 1995 season a creel survey to estimate angler harvest and effort and collect biological samples was conducted at the Alexander and Lake creek fisheries. This harvest and effort survey was conducted to determine what effect the more restrictive regulations had on the fisheries. Harvest and catch estimates for Alexander Creek were 1,716 and 2,023 fish, respectively, with an effort estimate of 17,644 angler-hours. The Lake Creek harvest and catch was estimated at 1,818 and 2,255 fish, respectively, with effort estimated at 34,958 angler-hours. When compared to the 1994 SWHS estimated harvest (Appendix A5) the 1995 Alexander Creek harvest declined by 44% and the Lake Creek harvest declined by 48%. This would indicate that the restrictions added for the 1995 season were successful in reducing the harvest to approximately half the 1994 level.

Escapement surveys conducted in 1995 revealed increased numbers in all index areas, however the BEG was achieved only in Lake Creek, with the Deshka River still considerably below its escapement objective (Table 27). A weir was constructed in the Deshka River in the spring of 1995 to count adult chinook salmon. A total of 10,048 chinook were counted through the weir. The aerial survey count resulted in 4,156 fish or 41% of the weir count (Table 27).

Age, sex and size samples were collected from the chinook salmon harvest and from the Deshka River weir (Table 23). Male chinook salmon accounted for 47% and 61% of the harvest in Lake and Alexander creeks, respectively, and age 5 and 6 chinook salmon dominated the harvest at both sites. The Deshka River weir sample contained 38% 4-year-old fish, with 5- and 6-year-old fish each comprising 30% of the population and the remaining 2% being 7 year olds. Males comprised 58% of the sample.

Management Objectives

Biological escapement goals for five Westside Susitna Management Unit systems have been established (Table 24). These escapement goals were based on historic escapement index counts. The management objective for these five systems is to achieve the escapement goals while providing maximum levels of sustained chinook salmon fishing opportunity.

The objective of regulations established for the 1995 season was to reduce the harvest to half the 1994 level. Based on results from two inseason creel surveys the 1995 harvest appears to have

decreased substantially with a corresponding increase in all westside Susitna River escapement indices. It is recommended that these regulations remain in effect to insure meeting the established escapement goals in the future.

In the Talachulitna River, only single-hook artificial lures may be used to allow for the sustained yields of trophy-sized rainbow trout. Full utilization of chinook salmon within this drainage is not a primary objective.

Recent Board of Fisheries Actions

Area regulation changes implemented in the November 1992 BOF meeting previously addressed in the overview include: (1) the seasonal five chinook salmon limit for all waters of Cook Inlet, (2) the prohibition of sport fishing guides from participating or engaging in fishing during the chinook salmon season while clients are present or within the guide's control, and (3) legislative action which prohibits anglers from fishing for chinook salmon without a king salmon stamp. In addition, the bag and possession limits for chinook salmon over 16 inches in length were reduced to one daily and two in possession.

During an October 1994 meeting the BOF delegated authority to restrict chinook salmon harvests in Northern Cook Inlet to the Commissioner of the ADF&G in order to address stock conservation concerns. Additional restrictions implemented by the ADF&G for the 1995 season were: (1) a possession limit of one chinook salmon over 16 inches in length, (2) prohibition of the use of bait during chinook salmon season, (3) limitation of recreational fishing during chinook salmon season to the hours of 6:00 a.m. through 11:00 p.m., and (4) closure of the Deshka River and Alexander Creek above the confluence of Trail Creek to fishing for chinook salmon.

The next BOF meeting concerning westside Susitna River fisheries will take place in February 1996.

Current Issues

Managers are concerned about increasing harvests and declining spawning escapements in the westside Susitna River drainage.

As previously noted, the Deshka River, Alexander Creek, Lake Creek and the Talachulitna River have been classified by the Alaska Legislature as recreation rivers. Motorized/nonmotorized restrictions and commercial-use permits are the most controversial issues associated with this plan. It is anticipated that restrictions will be in effect through regulation for the 1996 season.

Improved or expanded access to the western drainages of the Susitna River is yet another issue confronting the fisheries and fishery users of this area. Numerous recreational support industries that service the area as well as residents of the area favor retention of the region's wilderness (roadless) features. Many other interests support an expanded road system within the area which would promote development of mineral, forest, agriculture and recreation resources as well as enhance private settlement of the area. The issue of transportation corridors is addressed in Whitmore et al. 1993.

Ongoing Research and Management Activities

Escapement index counts by aerial survey have been performed annually on major westside Susitna River chinook salmon populations since the mid 1970s. Harvest trends for most Westside Susitna Management Unit stocks have also been assessed by the SWHS since chinook

salmon fishing reopened in 1979. SWHS estimates of harvest and participation generally agree with inseason creel harvest estimates. Inseason surveys have also documented age, length, and sex features of major chinook salmon stocks.

A juvenile chinook salmon coded wire tagging (CWT) program was initiated at the Deshka River in the spring of 1995. Tag recoveries will occur as these fish return to Cook Inlet waters and are intercepted in commercial, subsistence and recreational fisheries. In addition a weir was placed in the Deshka River where biological information was collected (Table 23) and 10,048 returning adult chinook salmon were counted. In the long term the CWT program and weir will provide data to determine the sustainable yield of chinook salmon in the Deshka River with the weir also increasing our understanding of the relationship between aerial surveys and total run size.

With the implementation of the five chinook salmon seasonal bag limit and king salmon stamp requirement, managers decided an enforcement program was necessary to insure compliance with the new regulations. During the 1995 season, department personnel actively inspected anglers' fishing licenses and harvest records.

Recommended Research and Management Activities

To increase spawning escapement in the Susitna River, regulations were adopted to reduce the 1995 harvest to approximately half of the 1994 level. Restrictions were implemented through the Administrative Procedure Act. Regulatory changes that affect the Westside Susitna Management Unit are: (1) close the entire Deshka River and Alexander Creek above the confluence of Trail Creek to chinook salmon fishing, (2) establish a possession limit of one chinook salmon in all Northern Cook Inlet waters, (3) prohibit the use of bait during chinook salmon season, and (4) limit recreational fishing to the hours of 6:00 a.m. through 11:00 p.m. In addition, depending on actual run strength, managers may use their emergency order authority inseason to further restrict or liberalize the fisheries to achieve escapement goals or harvest surplus fish. A similar conservative management strategy is recommended for 1996.

Chinook salmon escapement monitoring should be continued. Harvest trends should be evaluated annually through the SWHS. Inseason creel surveys that obtained harvest estimates and biological information at Alexander Creek and Lake Creek were conducted in 1995 and should continue in some form in 1996. Age, sex and size information collected during creel surveys from these fisheries is necessary for development of brood tables with the goal of refining BEGs and developing forecast techniques for these stocks.

The Deshka River CWT and weir project should be continued. It will provide much needed information on interception of Susitna River chinook salmon in marine fisheries and allow evaluation of the inriver return of Deshka River chinook salmon.

Enforcement activities by department staff should continue in support of Fish and Wildlife Protection to insure compliance with existing regulations.

West Cook Inlet Management Unit Chinook Salmon Fisheries

Fishery Description and Historical Perspective

The West Cook Inlet Management Unit extends south from the mouth of the Susitna River to the West Foreland of Cook Inlet (Figure 17). Streams of this area, with the exception of the Chakachatna-McArthur and the Beluga River drainages, are relatively small clearwater coastal drainages that originate in the Alaska Range or from slopes of Mount Susitna. The Chakachatna-

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Chinook salmon begin to arrive in the area during late May with the peak of most fisheries occurring during mid to late June. The stock is also harvested in the Northern District set gillnet fishery and the Tyonek and Upper Cook Inlet subsistence fisheries. Commercial fishing is permitted within 500 yards of the mouths of several streams.

From 1985 through 1990 participation in these fisheries reached record high levels (Table 5). During 1991 and 1992 participation in these fisheries decreased in response to reduced bag and possession limits and reduced season length. The participation level during 1993 again increased over the 1991 and 1992 levels.

The Theodore, Chuitna and Lewis rivers are the area's most prominent chinook salmon fisheries. The collective annual harvest of chinook salmon from these three streams from 1987 through 1993 ranged from 762 to 2,325 fish and averaged 1,632 fish (Appendix A6). Access to this area is by helicopter in the upper reaches of these streams and by airplane and vehicle to the lower reaches.

In recent years, observed spawning escapements in West Cook Inlet Management Unit streams have declined (Table 22). Observed escapements from 1989 through 1992 averaged 1,995 fish, less than half the average observed spawning escapement from 1981 through 1988. The reduced abundance of spawning chinook salmon in the West Cook Inlet Management Unit can not be attributed solely to elevated instream participation and harvest. Weak returns were also caused by flood-related mortality of eggs and juveniles which occurred in 1986. Inspection of the coastal streams after the October 1986 flood revealed substantial streambed scouring and rechannelization. In association with the flooding were severe erosion, landslides and subsequent deposition of earth and debris into the streams. The 1993 escapement index count showed an improvement over the previous 4 years but fell again in 1994 to just over 2,000. The 1994 escapement counts resulted in none of the streams meeting their escapement goals.

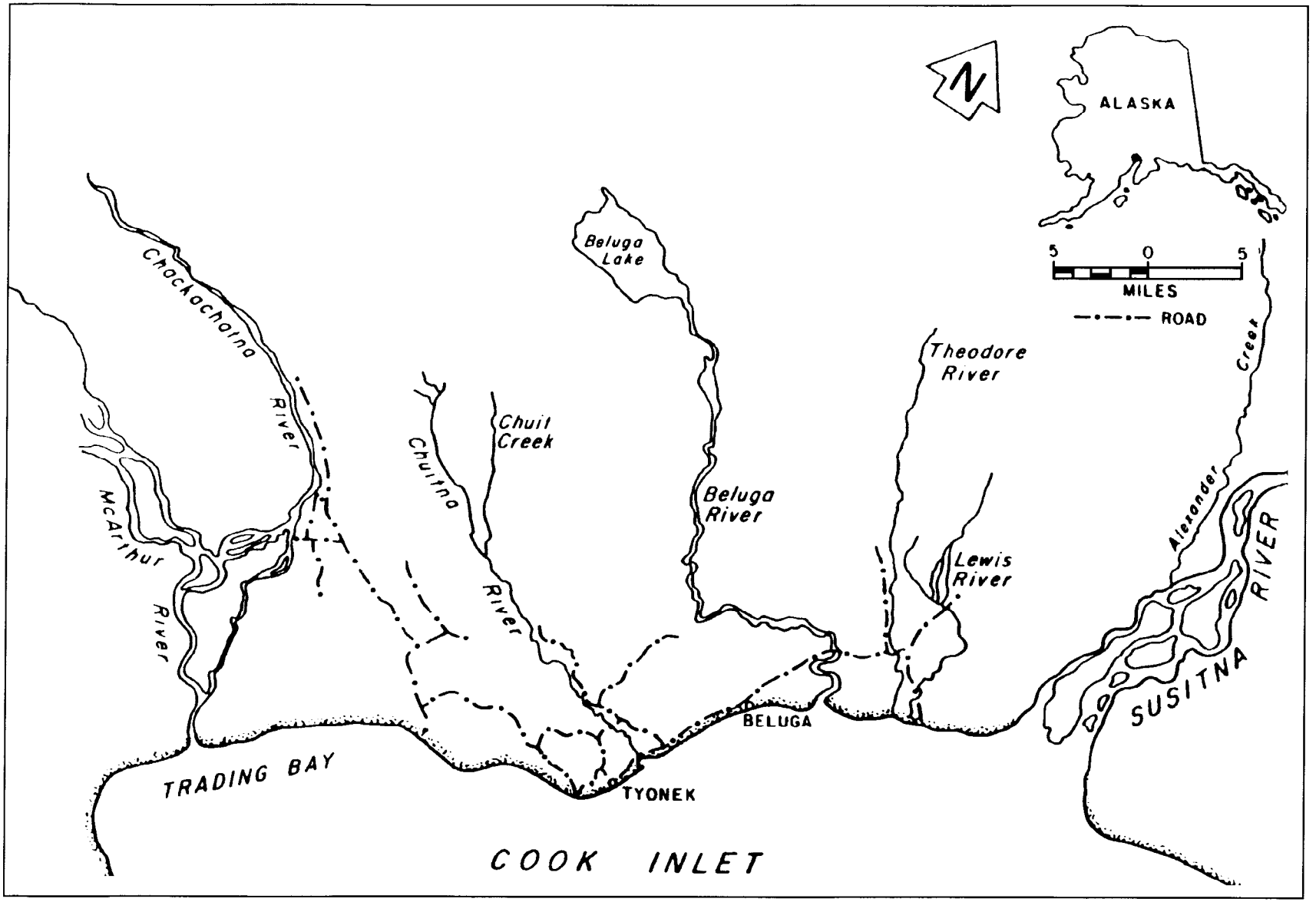


Figure 17.-Map of West Cook Inlet coastal streams.

The 1993 season ran from January 1 through June 30 with a bag and possession limit for chinook salmon 16 inches and greater of one per day and one in possession. The 1994 season proceeded without any additional regulations.

Recent Fishery Performance

Concern for Western Cook Inlet Management Unit chinook salmon stocks escalated during the early 1990s. Low catch rates in the commercial, subsistence, and recreational fisheries coupled with low observed spawning escapements has warranted restriction by regulation and emergency order for recreational fisheries (Appendix D).

The combined harvest for the West Cook Inlet drainage during 1994 was 1,577, a slight decrease from 1993 and just below the previous 5-year average of 1,650 (Appendix A6). Prior to the 1995 season additional regulations were initiated in order to reduce the harvest to half the 1994 level. These regulations were listed previously in the Chinook Salmon Fisheries Management Strategy section of this report. No harvest estimates are yet available for the 1995 season, but from inseason inspection and talking with guides and lodge owners the harvest appeared to be comparable to the 1994 harvest.

Spawning escapement counts in 1995 resulted in a slight increase over 1994, but all index areas fell below their established BEGs (Table 22). Escapement counts in the Lewis River have been dangerously low in the past 2 years. This, along with low harvest levels, may result in closure of the Lewis River to chinook salmon fishing in 1996.

Management Objectives

Biological escapement goals for three West Cook Inlet Management Unit streams have been established (Table 24). These escapement goals were based on historic escapement index counts. The management objective for these three streams is to achieve the escapement goal while providing maximum levels of sustained chinook salmon fishing opportunity.

Recent Board of Fisheries Actions

Board of Fisheries action taken in November of 1992 and recent legislative actions that apply to all waters of the NCIMA including West Cook Inlet chinook salmon fisheries, as described in the overview section, include: (1) the five chinook salmon seasonal limit, (2) prohibition of an individual or company engaged in freshwater sport fish guiding to participate or engage in sport fishing while clients are present or within their control, and (3) the requirement of a king salmon stamp to participate in the fishery.

Additional regulations specific to this area adopted by the BOF in November of 1992 include: (1) reduction in length of the chinook salmon season by 13 days to end on June 30; (2) in areas open to the retention of chinook salmon, reduction in the bag and possession limit to one daily 16 inches or more in length; and (3) the requirement that in specific areas only unbaited, artificial lures may be used and chinook salmon 16 inches or more in length may not be possessed or retained; all chinook salmon caught must immediately be released. Specific areas where chinook salmon may not be retained include: (1) Chuitna River Drainage: upstream of a department marker located adjacent to the old cable crossing, (2) Theodore River Drainage: upstream of a department marker located approximately 1 mile upstream of the Beluga/Anchorage high-voltage power lines, and (3) Lewis River Drainage: upstream of a department marker located approximately 1 river mile upstream of the main Beluga haul road bridge.

During an October 1994 meeting the BOF delegated authority to restrict chinook salmon harvests in Northern Cook Inlet to the Commissioner of the ADF&G in order to address stock conservation concerns. Additional restrictions implemented by the ADF&G for the 1995 season were: (1) prohibition of the use of bait during chinook salmon season, and (2) limitation of recreational fishing during chinook salmon season to the hours of 6:00 a.m. through 11:00 p.m.

The next BOF meeting concerning the West Cook Inlet Management Unit fisheries will be in February 1996.

Current Issues

The declining spawning chinook salmon abundance beginning in 1990 has become a major concern facing these fisheries. Managers believe this reduction is partially related to flood events during the 1980s. However, some fishermen, particularly those that reside within the Tyonek/Beluga area, believe that increased use of the area by helicopter fishermen is also responsible. The West Cook Inlet Management Unit streams have exhibited the same trend of declining escapement as seen in the Susitna River drainage.

Ongoing Research and Management Activities

Research and management activities directed at these fisheries have consisted of periodic onsite creel observation, annual assessment of chinook salmon escapement by helicopter, and estimation of annual harvest by the SWHS.

With the implementation of the five chinook salmon seasonal bag limit and king salmon stamp requirement, managers decided an enforcement program was necessary to insure compliance with the new regulations. Beginning in 1993 department personnel have inspected anglers' fishing licenses and harvest records for compliance.

Recommended Research and Management Activities

Chinook salmon fishery monitoring should be continued. Harvest trends should be evaluated annually through the SWHS.

To address stock conservation concerns managers have imposed regulations which were intended to reduce the 1995 harvest to approximately half of the 1994 level. These restrictions were implemented through the Administrative Procedure Act. The changes directly affecting the West Cook Inlet Management Unit are: (1) the use of bait will be prohibited during chinook salmon season (May 15 through July 13), and (2) recreational fishing will be allowed only between the hours of 6:00 a.m. and 11:00 p.m. during chinook salmon season. In addition, depending on actual run strength, managers may use their emergency order authority inseason to further restrict or liberalize the fisheries. A similar conservative strategy should continue in 1996.

Enforcement activities should be continued to insure compliance with existing regulations.

COHO SALMON FISHERIES

Recreational harvests of coho salmon in the NCIMA ranged from 15,637 to 79,858 fish during 1977 through 1994, and averaged 46,317 fish (Mills 1979-1994; Howe et. al. 1995) (Table 29 and Appendix A7). These harvests have accounted for 27% of the coho salmon harvests in the region and 18% of the statewide harvests during these years. Within the NCIMA, the Knik Management Unit, which includes the Little Susitna River, accounts for the largest harvest of

Table 29.-Northern Cook Inlet Management Area recreational harvest of coho salmon by management unit, 1977-1994.

	Northern Cook Inlet Management Area					Region II		Statewide	
Year	Knik Arm Unit	Eastside Susitna Unit	Westside Susitna Unit	West Cook Inlet Unit	Total	Number	% of NCIMA	Number	% of NCIMA
1977	4,366	5,709	6,599	532	17,206	67,866	25.3	105,004	16.4
1978	7,895	8,573	10,173	378	27,028	81,990	33.0	131,945	20.5
1979	7,139	7,564	9,036	337	24,076	93,234	25.9	119,329	20.2
1980	16,030	10,368	12,141	628	39,167	127,958	30.8	164,302	24.0
1981	10,484	6,593	6,189	604	23,870	95,376	25.2	125,666	19.1
1982	13,676	10,167	11,068	335	35,246	136,153	27.2	195,644	18.9
1983	6,139	5,176	3,758	564	15,637	87,935	18.0	149,270	10.6
1984	23,429	13,916	9,137	1,035	47,517	166,688	28.7	238,536	20.1
1985	14,339	7,042	11,270	1,431	34,082	137,671	24.8	200,773	17.0
1986	12,361	16,190	12,084	983	42,338	188,872	22.9	255,887	16.9
1987	25,787	11,028	8,547	2,825	48,187	176,710	27.4	235,435	20.5
1988	40,037	19,518	16,210	1,182	76,947	225,812	34.1	281,450	27.4
1989	23,846	17,078	18,216	2,270	61,203	237,155	26.0	338,195	18.2
1990	18,762	11,743	13,751	1,344	45,600	214,114	21.4	325,936	14.1
1991	22,186	19,479	19,901	2,485	70,939	254,961	25.2	389,569	16.5
1992	25,814	33,790	15,829	2,211	77,644	237,204	32.7	345,513	22.5
1993	35,763	26,063	15,072	2,960	79,858	283,868	31.1	412,487	21.4
1994	28,539	20,870	15,062	2,695	67,166	299,849	22.4	502,948	13.3
Mean	18,700	13,937	11,931	1,378	46,317	172,968	26.8	250,994	18.4
Mean % of NCIMA	40	30	27	3	100				

coho salmon. The Eastside Susitna Unit is second followed closely by the Westside Susitna Unit. West Cook Inlet Management Unit, with fewer accessible streams, is a distant fourth in average harvest. Harvests of coho salmon in the Knik Management Unit are dominated by harvests from the Little Susitna River while harvests from other management units have been spread across several systems (Appendices A8-A11).

In addition to recreational harvests, NCIMA area coho salmon stocks contribute to Cook Inlet commercial harvests. Commercial harvests of coho salmon in Upper Cook Inlet commercial fishing districts averaged 454,557 fish during 1977 to 1995 (Appendix B2). The Central District drift gillnet fishery accounted for approximately one-half of the average harvest (Appendix B3). Significant numbers of NCIMA bound coho salmon are harvested in the Western subdistrict of the Central District and in the General and Eastern subdistricts of the Northern District (Appendices B4-B7 and B9). The remaining commercial harvests of coho salmon are from several smaller subdistricts within the Central District (Ruesch and Fox *In prep*).

Management strategies for NCIMA coho salmon begin to develop as the stocks enter Cook Inlet and are intercepted by the commercial fishery. The magnitude, catch per unit effort, and distribution of the commercial harvest often become the first indicators of general run strength. As coho salmon enter fresh water, the department currently has very limited ability to gauge overall run size. In 1995, counting weirs at the Little Susitna River and the Deshka River provided the only quantitative measure of coho abundance in the many drainages of Northern Cook Inlet. Fish wheels and sonar at the Yentna River, and foot and aerial index counts for a few select streams also provide an understanding of relative abundance.

A creel survey to estimate coho salmon harvest and fishing effort was conducted at the Little Susitna River from 1982 through 1993. Intermittent or partial creel survey data have also been collected from other coho salmon fisheries.

Knik Arm Management Unit: Little Susitna River Coho Salmon Fishery

Background and Historical Perspective

The harvest of Little Susitna coho salmon has ranged from 2,835 to 27,610 during 1977 to 1994 (Table 30) (Mills 1979-1994; Howe et al. 1995). This level of harvest has consistently been second only to the Kenai River as the largest freshwater harvest in Alaska.

Coho salmon escapements to the Little Susitna River were measured by weir in 1986 and from 1988 through 1994. In 1986 the weir was damaged for several days by flood waters and the escapement count through the weir was incomplete (Table 31). Prior to 1986, coho salmon escapement abundance was indexed by ground and/or aerial methods when water conditions permitted. Escapement from 1988 through 1995 averaged approximately 23,200 coho salmon (Table 31).

Access to this fishery is described in the section addressing the river's chinook salmon fishery.

Coho salmon return to the Little Susitna River primarily from mid-July through early September. Approximately 50% of the return passes the department's weir at river mile 32.5 between August 8 and 16. Tagging studies indicate that coho salmon migrate slowly up the Little Susitna River and remain available to the fishery for about 4 weeks, after which they pass the George Parks highway bridge into waters closed to fishing for salmon. Spawning takes place from late

Table 30.-Harvest and effort for Little Susitna River coho salmon, 1977-1994.

Year	Harvest	Annual Effort in Angler-days[a]
1977	3,415	11,063
1978	4,865	12,127
1979	3,382	21,301
1980	6,302	22,420
1981	5,940	26,162
1982	7,116	24,020
1983	2,835	35,477
1984	14,253	48,517
1985	7,764	37,498
1986	6,039	45,776
1987	13,003	35,659
1988	19,009	49,731
1989	14,129	54,708
1990	7,497	40,159
1991	16,450	50,838
1992	20,033	49,304
1993	27,610	42,249
1994	17,665	45,149
Mean	10,963	36,231

[a] Participation directed at coho salmon represents only a portion of the annual effort.

Table 31.-Knik Arm drainage coho salmon escapement index counts, 1981-1995.

Drainage[a]	Little Susitna River[b]			Fish Creek[c]	Cotton-wood Ck.	Wasilla Creek Drainage			Matanuska River	Knik River Drainage			
Year	Hatchery	Non-hatchery	Total[f]			Wasilla Creek	Spring Ck. (Wasilla)	Spring Ck. (Flats)	Yellow Creek	McRoberts Creek	Upper Jim Creek	Eklutna Tailrace	Grand Total
1981			6,750	2,330	423	238	ns[d]	64	ns[d]	ns[d]	ns[d]	ns[d]	9,805
1982			6,800	5,201	737	171	ns[d]	105	ns[d]	ns[d]	ns[d]	ns[d]	13,014
1983			2,666	2,342	506	4	ns[d]	28	ns[d]	ns[d]	ns[d]	ns[d]	5,546
1984			20,991	4,510	935	876	ns[d]	90	ns[d]	ns[d]	ns[d]	ns[d]	27,402
1985			3,540	5,089	334	16	150	81	65	662	ns[d]	266	10,203
1986			7,511[e]	2,166	121	ns[d]	141	147	20	439	ns[d]	403	10,948
1987			4,865	3,871	360	251	110	42	58	667	ns[d]	1,587	11,811
1988	4,428	16,063	20,491	2,162	293	ns[d]	82	30	110	1,911	ns[d]	1,848	26,927
1989	6,862	8,370	15,232	3,479	147	ns[d]	67	39	226	597	ns[d]	253	20,040
1990	3,370	10,940	14,310	2,673	167	34	38	12	146	599	589	668	19,236
1991	8,322	29,279	38,249	1,297	158	118	16	5	136	484	418	286	41,172
1992	2,690	19,492	21,182	1,705	6	3	11	0	57	11	59	39	23,073
1993	9,189	25,633	34,822	2,078	265	ns[d]	67	69	490	503	535	496	39,325
1994	4,162	24,786	28,948	350	232	282	76	60	172	506	2,119	714	33,459
1995	1,135	11,131	12,266	390	398	46	20	38	220	702	1,288	107	15,475

[a] Aerial or foot surveys unless otherwise noted.

[b] Aerial or foot surveys 1981-1985 and 1987. Weir counts 1986, 1988-1994.

[c] 1982-1991 weir count plus stream survey; 1992, 1993 weir count only; 1994 and 1995 weir was removed on August 15 before the majority of the coho run.

[d] No survey conducted.

[e] Weir washed out in flood from July 21-July 29, 1986.

[f] 1988-1991 includes harvest upstream of the weir, 1992-1995 does not include harvest upstream of the weir.

September through mid-October. Spawning primarily occurs upstream from the George Parks Highway in the mainstem of the river, however some spawning occurs in tributary streams.

Supplemental coho salmon stocking has occurred at the Little Susitna River since 1982 (Table 32). Fingerling plants dominated the initial years of stocking but these releases generally yielded low returns. Beginning in 1987 returns from smolt releases started to make significant contributions to the sport harvest.

The contribution of hatchery fish to the sport harvest has ranged from 17% to 75% and averaged 38% of the creel survey harvest estimates during 1987 through 1994 (Bartlett and Conrad 1988, Bartlett and Vincent-Lang 1989, Bartlett and Sonnichsen 1990, Bartlett and Bingham 1991, Bartlett 1992-1994, Bartlett *In prep*).

Coho salmon smolt were initially released into Nancy Lake; which drains into the Little Susitna River about 6 miles downstream from the George Parks Highway (Figure 12). Nancy Lake did not support a return of adult coho salmon before stocking occurred. Rearing juvenile coho salmon used Nancy Lake by ascending Lake Creek from the Little Susitna River. Adults of hatchery origin now return to Nancy Lake where some spawn in tributaries to the lake. Eggs for the Little Susitna River stocking program, as well as for Bird, Campbell, and Ship creeks in the Anchorage Management Unit, were taken from the return to Nancy Lake.

The Little Susitna River coho salmon sport fishery has been managed in accordance with the Little Susitna River Coho Salmon Management Plan since 1991 and as modified following the 1992 season. Currently the bag and possession limits are set by the management plan at three coho salmon 16 inches or more in length.

Only unbaited, artificial lures are allowed in the Little Susitna River between July 15 and August 6. This requirement is designed to reduce the catch rate of the early-arriving nonhatchery stock, thereby reducing the hook-and-release mortality. Since the 1993 season this requirement resulted in an increase of nonhatchery fish to the escapement and preservation of the natural run timing. The hook-and-release mortality of bait-caught, ocean-fresh coho salmon has been documented to be approximately 70% (Vincent-Lang et al. 1993). The management plan allows the use of bait after August 6, a period when hatchery fish are more abundant in the fishery.

The management plan also directs liberalization of the bag and possession by emergency order to five coho salmon downstream of the counting weir and within a one-quarter mile radius of the confluence of Lake Creek and the Little Susitna River when the escapement goal of 7,500 nonhatchery coho salmon upstream of the Parks Highway is projected to be attained. Downstream of the Burma Road access site anglers are required to quit fishing when a bag limit of Little Susitna coho salmon is harvested. Coho salmon intended to be released cannot be removed from the water of the Little Susitna River. This requirement reduces hook-and-release mortality.

Creel and escapement observations have shown that coho salmon abundance at the Little Susitna River fluctuates widely. Inriver returns have ranged from 22,000 to approximately 62,000 during 1988 through 1994 (Tables 30 and 31).

Table 32.-Coho salmon stocking history for the Little Susitna River, 1982-1995.

Year Stocked	Fry Release Size (gms)	Fry Release Number Released	Fry Release Number Marked	Smolt Release Size (gms)	Smolt Release Number Released	Smolt Release Number Marked	Total Number Released
1982	0.57	2,950					2,950
1983	0.57	216,508	20,835				216,508
1984	0.91	426,216	10,000				426,216
1985	0.30	1,225,000	10,004	17.1	54,394	12,151	1,279,394
1986	1.00	316,270		17.2	580,065	24,401	580,065
1987				19.2	302,055	23,955	302,055
1988	1.00	3,374,126	3,126	20.1	438,374	24,628	3,812,500
1989				19.8	358,478	25,631	358,478
1990	1.1-2.0	473,327	72,327	20.8	308,356	45,220	781,683
1991				22.2	277,762	46,358	277,762
1992				23.8	312,925	43,482	312,925
1993				19.0	279,873	40,747	279,873
1994				19.7	126,694	43,818	126,694
1995				21.3	151,985	45,245	151,985

Recent Fishery Performance

The Little Susitna River coho salmon fishery was monitored through 1993 by creel survey at the Little Susitna River Public Use Facility launch to estimate fishing effort, harvest and the contribution of hatchery coho salmon to the harvest (Table 33). A creel survey was not conducted during 1994 or 1995. Instead, a program was established to estimate the proportion of hatchery fish in the catch and harvest. The 1994 proportional contribution of 26.8% was then applied to the 1994 SWHS harvest estimate of 17,665 fish (Table 30) for an estimate of 4,734 hatchery coho salmon to the sport harvest. The total 1994 return to the little Susitna River, including approximately 70% hook-and-release mortality of the released fish, was approximately 49,770 coho salmon. A small portion of the fish (500 to 1,000) included in the escapement at the weir were subsequently harvested upstream of the weir.

In 1995 a total of 2,252 coho salmon from Burma Road boat angler harvest was inspected. The inspected creels contained 171 coho salmon with a missing adipose fin. Based on the marked to unmarked ratio of hatchery fish (Table 32), the 1995 sport harvest was composed of approximately 23% hatchery fish.

In 1995, a total of 12,266 coho salmon were counted through the Little Susitna River weir (Table 31). An unknown but believed small number of coho salmon (500 to 1,000) were harvested upstream of the weir and in the fishery near Houston. The most recent harvest information for upstream of the weir was estimated in 1993 (Table 33). In 1993, 503 coho salmon were harvested upstream of the weir by anglers exiting through the Little Susitna River Public Use Facility launch. An additional 500 to 700 coho salmon were estimated to have been harvested by unsurveyed anglers near Houston. The 1994 harvest of coho salmon upstream of the weir was estimated to be similar in magnitude to the 1993 harvest but the 1995 harvest was probably lower due to lower 1995 escapement upstream of the weir (Table 31). The harvest of coho salmon upstream and downstream of the weir for 1995 will be estimated by the SWHS.

The contribution of hatchery coho salmon to the total number of coho salmon counted through the weir in 1995 was estimated to be approximately 1,100 fish (Table 31). The total estimated return to the Little Susitna River including the harvest, hook-and-release mortality, and spawning escapement will not be known until the SWHS harvest estimate is available in October 1996.

The 1995 escapement of spawning nonhatchery coho salmon upstream of the Parks Highway was roughly 10,200 fish.

During the 1994 season the Central and Northern District harvests of the Cook Inlet commercial fishery were sampled to estimate the contribution of hatchery fish (Stratton et al. 1996). Approximately 137,000 coho salmon were examined from the commercial harvests for a missing adipose fin (indicating the fish had been marked at a hatchery). The contribution of Little Susitna River hatchery stocks to the 1994 commercial harvests was estimated to be about 19,900 fish. The estimated contribution of Little Susitna River released hatchery coho salmon to the 1995 Cook Inlet commercial fisheries is pending analysis of 1995 tag returns.

Table 33.-Creel survey estimates of coho salmon harvest, catch and effort by boat anglers on the Little Susitna River, 1991-1994.

Location	Harvest	Harvest Rate	Catch	Catch Rate	Effort Angler-Hrs
1991					
Little Susitna River, Burma Rd.					
Above weir	427	0.262	672	0.412	1,633
Below weir	13,091	0.408	16,928	0.528	32,076
Total[a]	13,514	0.400	17,580	0.521	33,769
Little Susitna River, Houston					
Miller's Landing	417	0.242	476	0.276	1,722
Miller's Reach	148	0.161	188	0.204	920
Total	565	0.214	644	0.244	2,642
Grand Total	14,079	0.387	18,224	0.500	36,411
1992					
Little Susitna River, Burma Rd.[b]					
Above weir	338	0.260	470	0.362	1,300
Below weir	8,401	0.202	11,317	0.272	41,645
Total	8,739	0.204	11,787	0.275	42,945
1993					
Little Susitna River, Burma Rd.[b]					
Above weir	503	0.416	651	0.538	1,210
Below weir	10,549	0.415	11,661	0.459	25,403
Total	11,052	0.415	12,312	0.463	26,613
1994					
Harvest not estimated in 1994.					

[a] The 1991 total estimates may differ slightly from the sum of the above and below weir estimates.

[b] A Houston creel survey was not conducted in 1992 or 1993.

Management Objectives

In 1995, management objectives for the Little Susitna River were: (1) to provide 7,500 naturally spawning coho salmon upstream of the George Parks Highway; (2) to ensure that the historical age and sex composition of naturally spawning fish, and the run timing of the natural stock were not altered by supplemental coho salmon production; (3) to supplement the natural stock of coho salmon with hatchery coho salmon; and (4) to provide coho salmon fishing opportunity from the George Parks Highway downstream to tidewater without emergency restrictions (ADF&G *Unpublished*).

Recent Board of Fisheries Actions

During the November 1992 Board of Fisheries meeting the Little Susitna River Coho Salmon Management Plan was amended. The amendment increased the coho salmon bag limit from July 15 through August 5 from one to three fish daily and in possession. It also established a bait prohibition during the same time period. No additional regulations for coho salmon have been adopted since the 1992 action.

Current Issues

There are four primary issues associated with Little Susitna River fisheries: (1) management of the area under the Recreation Rivers Act, (2) South Big Lake Road extension to the Little Susitna River and the associated campground (Whitmore et al. 1993), (3) damage to riparian vegetation and accelerated stream bank erosion in areas heavily used by the public, and (4) concern by residents of the Houston area that the weir delays salmon run timing to the upper river.

Department of Natural Resources regulations for the Recreation Rivers Act became effective on December 13, 1995. These regulations are the first implementation phase of the Susitna Basin Recreational River Management Plan which was adopted in 1991.

The South Big Lake Road extension was completed to within approximately 1 mile of the Little Susitna River in October 1994. A rough 4x4 trail leads to the river along the proposed road route. Although the Matanuska-Susitna Borough (MSB) Department of Public Works does not plan to resume construction of the road in 1995, construction will continue as soon as money is appropriated (G. Strouthers, MSB Public Works, personal communication). The road will intersect the river approximately 8 river miles upstream of the Little Susitna Public Use facility. The project includes a proposed 400 vehicle campground and a nonpowered boat launch. This project will contribute to the trend of increasing angler participation.

Some residents of the Houston area purported the weir was delaying the arrival of salmon to the Houston area. In August 1995 a city council meeting was held to discuss alternatives to the location of the weir at river mile 32.5. The meeting was attended by Sport Fish Division staff, Houston City Council members, Matanuska-Susitna area legislators, and members of the public. At this meeting it was decided to move the main weir upstream of the George Parks Highway to census adult coho salmon. In addition to moving the weir, it was decided to stop stocking hatchery coho salmon in the Little Susitna River starting in 1996. Elimination of the hatchery program was in recognition that stocking has not provided additional angler opportunity. At other sites in Northern Cook Inlet where similar levels of stocking have been implemented, up to 15,000 angler days annually have been provided.

Ongoing Research and Management Activities

In 1995 the Little Susitna River coho salmon program consisted of the creel inspections and coded wire tag recoveries from the sport harvest of boat anglers exiting the fishery through the Little Susitna River Public Use Facility boat launch, and coded wire tag recovery from the escapement through the counting weir. The 1995 harvest of coho salmon from the Little Susitna River will be available from the SWHS in 1996.

In 1996 inspection of the sport harvest for hatchery fish will continue. The counting weir will be moved upstream of the George Parks Highway to census the daily passage of coho salmon. Collection of information to estimate run timing and the age, size and sex composition of the escapement will be included in the 1996 program.

The Division of Sport Fish also funds the operation and maintenance of the Little Susitna River Public Use Facility. Day to day operation is performed by the ADNR Division of Parks and Outdoor Recreation under terms of a contract with ADF&G.

Recommended Research and Management Activities

It is recommended that the coho salmon research program be continued in 1996 and that the 7,500 nonhatchery coho salmon escapement goal continue to be evaluated.

The release of hatchery reared coho salmon smolt in the Little Susitna River drainage was terminated with the 1995 release. Total angling effort from 1983 through 1994 averaged about 44,400 angler days (Table 30). The nonhatchery stock appears to be in sufficient quantity (Table 31) to support current levels of angling effort without additional enhancement.

To complement the cessation of enhancement, additional protection of natural-spawning stock would be warranted. Current regulation requires a prohibition of bait between July 15 and August 6 to reduce the hook-and-release mortality and preserve the run timing of early-arriving nonhatchery stock. Bait is allowed after August 5 when hatchery coho salmon are more common in the river. In the absence of hatchery coho salmon, additional management action may be required to effectively reduce the magnitude of hook-and-release mortality to help provide more fish for spawning and harvest.

Although this fishery has been relatively stable for the past several years, future management planning must recognize that increased angling participation is likely to occur. Inriver returns and the escapement goal of spawning stock should be maximized in part, through the enforcement of fishery regulations designed to reduce harvest efficiency during critical periods, and through habitat actions focusing on river bank restoration and protection. The location, type, and number of public recreation facilities, such as campgrounds, launches, and trails, that are ultimately constructed along the river should become a component in the long-term planning to provide diverse fishing opportunities.

Knik Arm Management Unit: Other Coho Salmon Fisheries

Background and Historical Perspective

In addition to the Little Susitna River, the Knik Arm Management Unit supports five significant recreational coho salmon fisheries, the area's only personal use dip net fishery, and two educational permit fisheries (Figure 18). Fish Creek, Cottonwood Creek, and Wasilla Creek are restricted to primarily intertidal fisheries that provide weekend-only salmon fishing. Weekend-only fishing has been mandatory on these streams since 1971 because harvestable stock surpluses

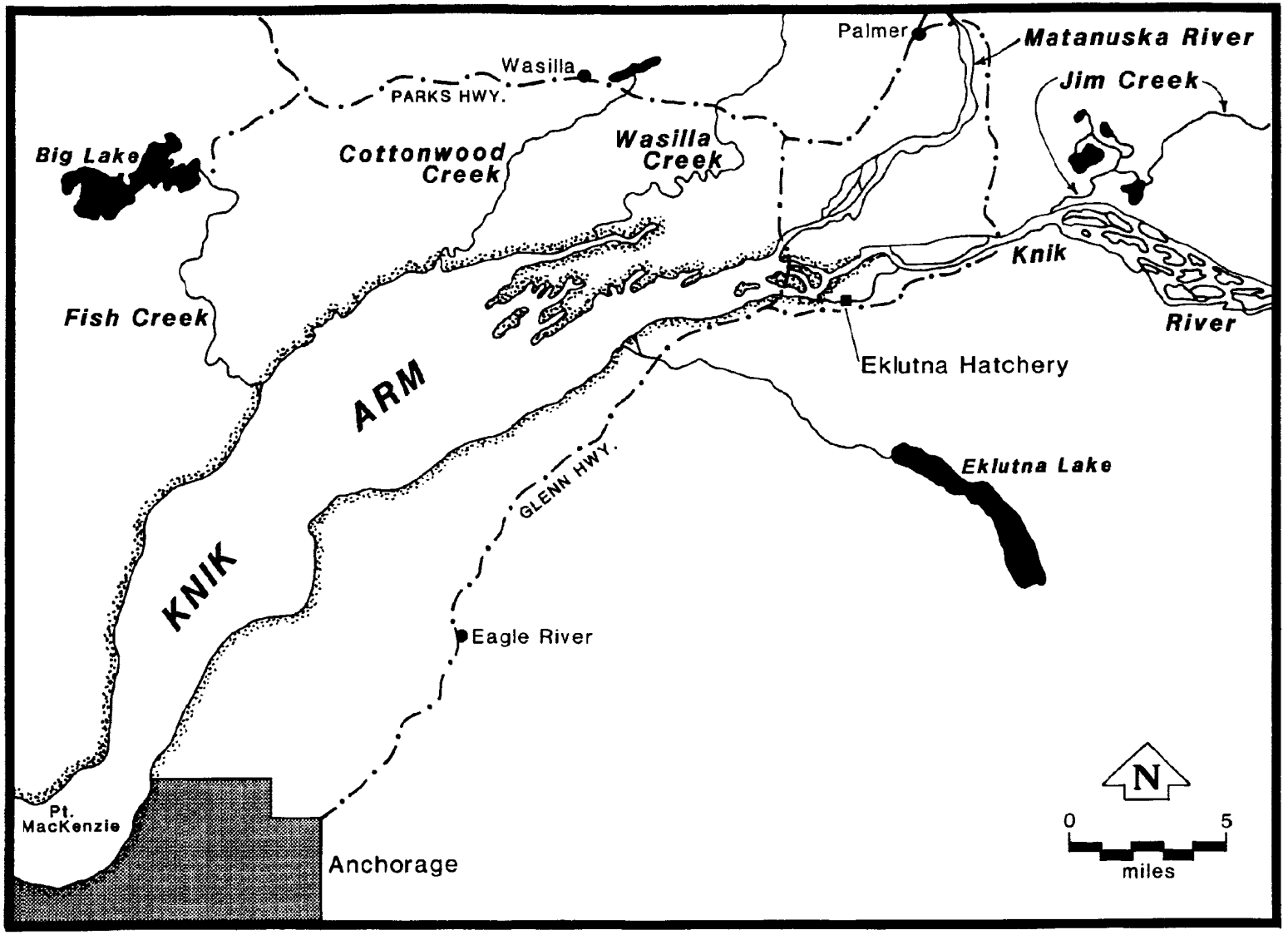


Figure 18.-Map of the Knik Arm drainage.

cannot normally accommodate continuous daily exploitation. Motor boats are not permitted on Wasilla Creek during weekends from July 15 through August 15.

The Eklutna Hydroelectric Power Plant tailrace (Figure 19) is a recreational fishery that is largely supported by coho salmon returning to the Cook Inlet Aquaculture Association's (CIAA) hatchery located at the head of the tailrace. The nonprofit Eklutna hatchery began operation in 1982. Current production goals are 9 million sockeye salmon eggs of Big Lake brood and 100,000 coho salmon eggs taken from returning Eklutna stock (CIAA 1995). Coho salmon are released into the tailrace as smolt. A fish ladder links the hatchery with the tailrace which in turn drains into the Knik River.

The Eklutna sport fishery is confined to the one-half-mile long tailrace. Coho, chum, and a few sockeye salmon are harvested by sport fishery anglers within the tailrace. All but the terminal 100 yards of the tailrace are subject to preferential harvest rights by the Aquaculture Association. Salmon of Knik River, and recently of Matanuska River, drainage origin are also harvested at the confluence of the tailrace and the Knik River. In 1995, several chinook salmon were taken at the mouth of the tailrace. The Knik River is not known to support chinook salmon. These chinook salmon are believed to be of Matanuska River origin which now pause at the mouth of the raceway because of recent nearby changes in the confluence of the Matanuska and the Knik rivers. The Knik and Matanuska river drainages are closed to fishing for and the taking of chinook salmon.

Jim Creek, excluding the Little Susitna River, is traditionally the largest Knik Arm recreational fishery in terms of both participation and coho salmon harvest. This stream enters the glacial Knik River about 10 river miles from salt water. The entire Jim Creek drainage is open to coho salmon fishing throughout the year. The greatest fishing effort occurs at the confluence in an area locally known as the Jim Creek Flats. Fishing effort and harvest rates at the confluence are sharply influenced by the Knik River discharge. Jim Creek Flats are very difficult to fish during periods of high Knik River discharge because the entire area becomes inundated by glacial waters. Upstream reaches of Jim Creek can be accessed by power and nonpower boats.

Coho salmon return to the Knik Arm fisheries from late-July through August. Spawning occurs from late September through mid-October. The average weight of Knik Arm coho salmon, excluding those of Little Susitna River origin, is less than 6 pounds. Bag and possession limits for all Knik Arm fisheries are three coho salmon 16 inches or more in length. The collective annual harvest for these five fisheries averaged 9,051 coho salmon during the period 1987 through 1994 (Mills 1988-1994, Howe et al. 1995) (Table 34, Appendix A8). Jim Creek averaged 4,789 coho salmon during this period whereas the three weekend-only fisheries each averaged from about 678 to 1,033 fish annually.

Coho salmon have been stocked into each of these systems (Table 35). Stocking of Fish and Cottonwood creeks was initiated during the late 1970s, Eklutna Tailrace in 1981 and Jim and Wasilla creeks in the late 1980s. Coho salmon stocked in systems, except the Eklutna Tailrace, were fingerlings during the majority of the years. The Eklutna facility, operated by Cook Inlet Aquaculture Association, has annually released smolt. Contribution of hatchery fish to the catch and harvest in these recreational fisheries has not been evaluated.

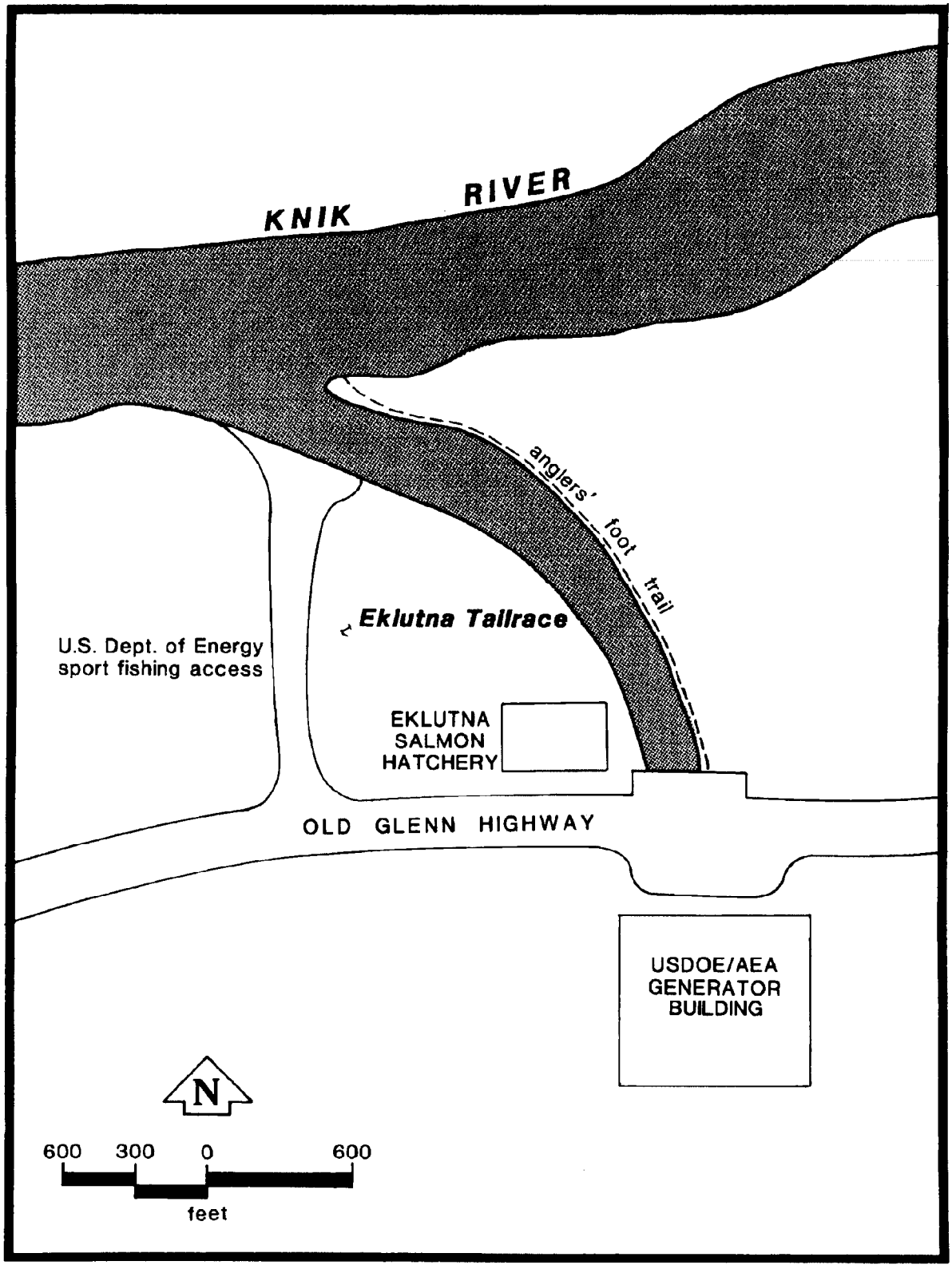


Figure 19.-Map of the Eklutna hatchery and Eklutna powerplant tailrace.

Table 34.-Fishing effort and coho salmon harvest from Knik Arm fisheries, 1977-1994.

	Wasilla Creek		Cottonwood Creek		Fish Creek		Eklutna Tailrace		Jim Creek		Total	
Year	Harvest	Angler- days[a]	Harvest	Angler- days[a]	Harvest	Angler- days[a]	Harvest	Angler- days[a]	Harvest	Angler- days[a]	Harvest	Angler- days[a]
1977	472	2,805									472	2,805
1978	2,112	3,446									2,112	3,446
1979	1,211	4,024	1,198	5,345							2,409	3,446
1980	3,555	5,726	3,375	9,268							6,930	14,994
1981	814	4,019	1,373	8,663					1,801	4,904	3,988	17,586
1982	1,624	6,261	1,886	5,186					2,306	6,653	5,816	18,100
1983	345	3,239	518	5,944					774	9,183	1,637	18,366
1984	1,920	3,547	1,895	7,144			561	3,413	3,429	9,369	7,805	23,473
1985	1,900	3,115	1,005	4,560	284	903	557	2,995	2,523	8,970	6,269	20,545
1986	944	3,387	690	5,653	364	2,641	502	8,549	2,948	13,015	5,448	33,245
1987	1,195	2,173	1,159	2,934	833	2,898	2,318	11,663	3,676	6,990	9,181	26,658
1988	1,273	2,228	746	4,056	1,637	3,110	3,329	13,188	11,078	23,229	18,063	45,811
1989	975	2,406	876	3,069	784	3,314	1,666	10,342	4,220	11,141	8,521	30,272
1990	1,012	2,679	286	3,056	398	3,936	1,012	7,618	6,184	17,878	8,892	35,167
1991	874	2,893	176	1,623	486	3,693	631	5,892	2,920	13,736	5,087	27,837
1992	413	1,110	348	1,974	526	3,638	664	4,279	3,409	8,856	5,360	19,857
1993	1,133	1,774	736	3,077	741	2,341	1,337	4,523	2,878	6,824	6,825	18,539
1994	1,390	2,226	1,100	3,230	492	2,358	3,553	8,974	3,946	9,658	10,481	26,446

[a] In some cases, participation includes effort directed at species other than coho salmon.

Table 35.-Summary of coho salmon stocked in Cottonwood, Wasilla, Jim, and Fish creeks and the Eklutna tailrace, 1977-1995.

Brood Year	Brood Stock	Release Year	Release Drainage	Average Size (g)	Number Released	Number Marked
Big Lake Hatchery						
1977	Big Lake	1978	Cottonwood Creek	0.80	317,694	32,064
1978	Big Lake	1979	Cottonwood Creek	0.54	246,762	19,992
1979	Big Lake	1980	Cottonwood Creek	0.63	154,991	15,000
1979	Big Lake	1980	Cottonwood Creek	0.49	155,004	15,000
1980	Big Lake	1981	Cottonwood Creek	0.59	299,742	30,528
1981	Big Lake	1982	Cottonwood Creek	0.45	364,911	89,389
1982	Cottonwood Lk & Big Lake	1983	Cottonwood Creek	0.45	368,022	23,465
1983	Cottonwood Lk Big Lake	1984	Cottonwood Creek	0.91	372,318	10,373
1984	Cottonwood Lk & Big Lake	1985	Cottonwood Creek	0.30	317,000	10,000
1985	Big Lake	1986	Cottonwood Creek	0.85	315,881	13,092
1986	Big Lake	1987	Cottonwood Creek	1.4	315,916	15,600
1987	Big Lake	1988	Cottonwood Creek	1.1	597,000	0
1987	Big Lake	1989	Cottonwood Creek	16.4	16,900	0
1989	Big Lake	1990	Cottonwood Creek	1.1	202,000	0
1989	Big Lake	1991	Cottonwood Creek	25.3	72,000	0
1990	Big Lake	1992	Cottonwood Creek	11.0	53,900	35,341
1991	Big Lake	1993	Cottonwood Creek	12.1	74,198	40,875
1986	Big Lake	1988	Wasilla Creek	17.0	12,850	0
1987	Big Lake	1989	Wasilla Creek	15.7	21,600	0
1989	Big Lake	1990	Wasilla Creek	1.1	152,000	0
1989	Big Lake	1991	Wasilla Creek	25.0	69,500	0
1990	Big Lake	1992	Wasilla Creek	10.9	76,315	44,148
1991	Big Lake	1993	Wasilla Creek	11.4	77,174	41,711
1986	Big Lake	1988	Jim Creek	17.0	7,550	0
1987	Big Lake	1989	Jim Creek	16.4	20,100	0
1989	Big Lake	1990	Jim Creek	1.1	163,000	0
1976	Big Lake	1977	Fish Creek	0.28	40,673	0
1977	Big Lake	1978	Fish Creek	0.70	101,081	40,959
1978	Big Lake	1979	Fish Creek	0.49	383,295	30,218
1979	Big Lake	1980	Fish Creek	0.58	450,827	22,337
1980	Big Lake	1981	Fish Creek	0.64	118,071	13,072
1981	Big Lake	1982	Fish Creek	0.45	596,975	23,735
1982	Big Lake	1983	Fish Creek	0.45	1,379,179	24,329
1983	Big Lake	1984	Fish Creek	0.76	987,166	11,166
1984	Big Lake	1985	Fish Creek	0.30	1,641,600	10,000
1985	Big Lake	1986	Fish Creek	1.0	2,354,725	13,497
1986	Big Lake	1987	Fish Creek	1.2	1,906,945	15,632
1986	Big Lake	1987	Fish Creek	7.8	445,310	20,010
1986	Big Lake	1988	Fish Creek	17.0	20,400	20,400
1987	Big Lake	1988	Fish Creek	1.2	1,562,850	14,050
1987	Big Lake	1988	Fish Creek	7.6	366,226	21,384
1987	Big Lake	1989	Fish Creek	15.7	10,644	9,644

-continued-

Table 35.-Page 2 of 2.

Brood Year	Brood Stock	Release Year	Release Drainage	Average Size (g)	Number Released	Number Marked
1988	Big Lake	1990	Fish Creek	19.0	21,671	5,671
1989	Big Lake	1990	Fish Creek	1.2	504,077	20,077
1989	Big Lake	1991	Fish Creek	25.3	82,988	9,488
1990	Big Lake	1992	Fish Creek	10.9	74,953	45,538
1991	Big Lake	1993	Fish Creek	10.8	67,934	43,257
Eklutna Hatchery						
1981	Cottonwood Lk & Big Lake	1983	Tailrace	15.4	>>633[a]	452
1982	Cottonwood Lk & Big Lake	1984	Cottonwood Creek	18.7	16,244	15,757
1982	Cottonwood Lk & Big Lake	1984	Tailrace	18.7	>>28,150[a]	27,306
1984	Cottonwood Lk & Big Lake	1986	Tailrace	22.0	101,326	101,326
1985	Eklutna	1987	Tailrace	25.0	147,715	14,772
1986	Eklutna	1988	Tailrace	16.0	72,881	7,300
1987	Eklutna	1988	Jim Creek	1.4	68,000	0
1987	Eklutna	1989	Tailrace	19.0	50,787	2,052
1988	Eklutna	1990	Tailrace	21.6	54,278	2,916
1989	Eklutna	1991	Tailrace	22.0	21,285	1,381
1990	Eklutna	1992	Tailrace	16.7	131,829	0
1991	Eklutna	1993	Tailrace	15.9	108,000	0
1992	Eklutna	1994	Tailrace	11.5	62,400	0
1993	Eklutna	1995	Tailrace	16.9	69,867	0

[a] Some fingerlings escaped into tailrace due to vandalism.

Knik Arm coho salmon are harvested commercially in the Central and Northern Districts of Cook Inlet (Appendices B1-B7 and B9). The stocks are also harvested within Knik Arm by a special set gillnet fishery that operates near the mouth of Fish Creek. The Knik Arm commercial gillnet fishery has been conducted annually since 1987. Coho salmon harvests from this fishery have ranged from 809 to 11,604 and averaged 3,603 coho salmon annually during the period 1987 through 1995 (Table 36). The Knik Arm commercial set net fishery is discussed further in the Fish Creek Sockeye Salmon Fishery section of this report.

Recent Fishery Performance

The 1994 recreational harvest for Knik Arm streams was up 54% from the 1993 harvest while the combined recreational harvest for Knik Arm streams was up about 16% over the 1987 to 1994 average combined harvest (Table 34). The angler days of participation from these fisheries during 1994 was up 42% from 1993 but about 8% below the combined averages for the 1987 to 1994 period.

Several indexed spawning escapements to Knik Arm streams were considerably lower to those indexed in 1994 (Table 31). Negative departures from the 1994 index were: Wasilla Creek down 84%; Spring Creek, a tributary of Wasilla Creek down 74%; Spring Creek on the Palmer flats down 34%; and upper Jim Creek down 39%. Water conditions in 1995 were generally favorable for index counts except in upper Jim and McRoberts creeks where a recent flood had washed many spawned-out coho salmon carcasses downstream into receiving lakes. The remainder of Knik Arm streams had index counts similar to or higher than in 1994.

The Knik Arm commercial set net fishery was executed under the Fish Creek Sockeye Salmon Management Plan during the 1995 season. The coho salmon harvest was 1,904 fish; which was a 135% increase over the 1994 harvest, only 47% of the 1987 to 1994 average of 3,603 fish (Table 36).

Management Objectives

Biological escapement goals have been established for Fish, Wasilla, Cottonwood, and Jim creeks (Table 37). These escapement goals are based on historic escapement index counts. The management objective for these three systems is to achieve the escapement goal while providing a maximum level of sustained coho salmon fishing opportunity.

Stocking of coho salmon in Wasilla, Cottonwood, and Fish creeks was terminated following the 1993 release due to closure of the Big Lake hatchery (Table 35). Management activities to evaluate the hatchery contribution to these fisheries were terminated.

Recent Board of Fisheries Actions

There have been no recent Board of Fisheries actions directly associated with Knik Arm recreational fisheries. Actions taken during the 1992 meeting that increased the number of coho salmon returning to Knik Arm included:

1. Moving the personal use Fish Creek dip net fishery off the beach and into the mouth of the creek. This action stopped the interception by the dip net fishery of coho salmon destined for other Knik Arm streams.
2. District registration for Northern District set gillnet fishermen.

Table 36.-Harvest of coho salmon in the Knik Arm commercial set net fishery, 1987 through 1995.

Year	Coho Salmon	Dates
1987	2,043	Jul 27 - Jul 29
1988	11,604	Jul 23 - Jul 29
1989	6,075	Jul 24 - Jul 29
1990	5,708	Jul 27 - Jul 29
1991	1,630	Jul 21 - Jul 23
1992	1,817	Jul 19 - Jul 26
1993	831	Jul 18 - Jul 25
1994	809	Jul 19 - Jul 24
1995	1,904	Jul 16 - Jul 25
Mean	3,603	Range Jul 16 - Jul 29

Table 37.-Coho salmon biological escapement goals (BEG) for Knik Arm Management Unit streams.

Stream	BEG[a]
Cottonwood Creek	300
Wasilla Creek	300
Fish Creek	2,700
Jim Creek drainage	1,000

[a] Biological escapement goal.

3. Limiting Northern District set gillnet fishermen to regularly scheduled periods after August 15.
4. Restricting the Central District drift gillnet fleet to waters within 1 nautical mile of the west shore of Cook Inlet after August 15.

Current Issues

The 1995 Upper Cook Inlet commercial coho salmon harvest of 446,954 fish can be considered an average harvest (Appendix B2). There is continuing controversy regarding the allocation of these stocks between commercial and recreational fisheries.

The biological escapement goal of 300 fish for Cottonwood Creek (Table 37) was exceeded in 1995 (Table 31). A survey of additional index area in Wasilla creek, however, failed to produce additional fish and the goal was not met by increasing the area indexed. The escapement of coho salmon into Cottonwood, Wasilla and Fish creeks remains of concern to fishery managers.

Urbanization remains a concern with Knik Arm stocks. Spawning streams which support fisheries in the Knik Arm Management Unit, excluding the Little Susitna River, are small in size and have easy public access. Several of the streams flow through residential areas. Habitat degradation to these streams and spawning areas due to urbanization is evident. Additionally, available information and enforcement action suggests that a substantial amount of salmon poaching occurs in these drainages by the use of hook and line, dip nets, gillnets, and fish traps. Considering long-term declining trends in abundance of stocks, the need to address these fishing infractions and habitat violations continues.

Ongoing Research and Management

Annual harvest and effort information pertaining to these fisheries is obtained from the SWHS. Spawning escapement is assessed by means of a weir on Fish Creek and through ground surveys within established index areas. The Fish Creek weir and index survey programs will continue during the 1996 season.

Recommended Research and Management Activities

The indexing of coho salmon in Knik Arm streams should continue.

Wasilla and Cottonwood creeks should be considered as candidates for future stocking.

Eastside Susitna, Westside Susitna, and West Cook Inlet Management Units Coho Salmon Fisheries

Fishery Description and Historical Perspective

Coho salmon harvests in these three management units have averaged 27,580 fish during 1977 through 1994 (Mills 1979-1994; Howe et. al. 1995) (Table 29). The Susitna River drainage supports the largest coho salmon stock within the NCIMA and the contribution of the harvest from the Eastside Susitna and Westside Susitna Management Units has been approximately 57% of the total NCIMA coho salmon harvest during this time period. The West Cook Inlet Management Unit contribution to the total NCIMA has been approximately 3% during this time period.

A description of these management units, including access to these areas, is presented in the chinook salmon section of this report. Coho salmon returning to these units are early-run stocks which begin to enter these drainages about mid-July. The migration into the Yentna River

(Susitna River mile 28, Westside Susitna Management Unit) drainage normally peaks the last week in July whereas the peak passage into the Talkeetna River (Susitna River mile 99, Eastside Susitna Management Unit) takes place 7 to 10 days later. Few coho salmon enter the Susitna River after early September. Most spawning occurs between mid-September and mid-October. Little information is available regarding West Cook Inlet Management Unit coho salmon run timing, however it is assumed to be similar to that of the Susitna River.

Total coho abundance in the Susitna River drainage has not been estimated. Abundance in portions of this vast drainage have been measured by sonar, fish wheels, weir, and mark-and-recapture methods. During the period 1981 through 1983, coho salmon abundance was estimated to average 47,000 fish in the Susitna River excluding all systems below river mile 80 (Table 38). It is important to recognize that significant coho salmon returns occur in tributaries that enter the Susitna River downstream from river mile 80. Coho salmon abundance in such systems as the Deshka River, Alexander Creek, and Willow Creek, as well as many other important coho salmon sport fisheries, were not measured during the 1981-1983 studies.

Coho salmon abundance in the Yentna River has been estimated by side-scan sonar and fish wheels since 1981. Estimates made during 1981-1984 encompassed the entire coho salmon migration. Yentna River sonar enumeration of coho salmon entering the Yentna River drainage has ranged from 6,279 to 74,346 fish during 1981 to 1995 (Table 38). From 1985 to 1995 the sonar program was terminated prior to the end of the coho salmon return. The number of coho salmon passing river mile 80 on the Susitna River exceeded the number of coho salmon entering the Yentna River each year during the period 1981 to 1983. Side-scan sonar to enumerate salmon, and fish wheels to apportion fish by species may not be adequate tools to enumerate coho salmon. Coho salmon migrating up the Yentna River may be distributed across the entire river while the sonar only counts fish swimming along river banks.

Very little information is available regarding coho salmon spawning abundance in the West Cook Inlet Management Unit. An index survey of Threemile Creek near Beluga was conducted by local residents and reported to the Department of Fish and Game in 1992 but no other coho salmon escapement information has been collected during recent years from this management unit.

The Deshka River, Alexander Creek and Lake Creek are the major Westside Susitna Management Unit coho salmon fisheries. Coho salmon harvest from these three streams averaged 7,641 fish during the period of 1977 to 1993. This harvest accounted for 65% of the Westside Susitna Management Unit coho salmon harvest (Appendix A10).

Coho salmon were counted through a weir at approximately river mile 17 on the Deshka River during 1995. The entire run was not counted because an unknown number of fish spawn in the Deshka River and several tributaries downstream of river mile 17. Water conditions did not permit indexing these fish when the weir was removed on September 4, 1995. A total of 12,824 coho salmon were counted.

All the Eastside Susitna Management Unit tributaries provide fishing opportunities for coho salmon. During recent years Willow Creek, Montana Creek and the Talkeetna River have produced the largest coho salmon harvests in this management unit, averaging 7,903 fish between 1977 and 1994 and accounting for 66% of the Eastside Susitna harvest (Appendix A9).

Table 38.-Eastside and westside Susitna River drainage coho salmon escapement index counts, 1981-1995.

	Westside Susitna River Drainage			Eastside Susitna River Drainage[a]					
Year	Yentna River[c]	Rabideux Ck.	Total	Birch Ck.	Question Ck.	Answer Ck.	Total	Susitna River[b]	Grand Total
1981	17,017	ns[d]	17,017	ns[d]	ns[d]	ns[d]	ns[d]	37,000	54,017
1982	34,089	ns[d]	34,089	ns[d]	ns[d]	ns[d]	ns[d]	80,000	114,089
1983	8,867	ns[d]	8,867	ns[d]	ns[d]	ns[d]	ns[d]	24,000	32,867
1984	16,007	480	16,487	236	60	57	353	ns[d]	16,840
1985	9,181	82	9,263	30	89	9	128	ns[d]	9,391
1986	23,457	ns[d]	23,457	25	ns[d]	ns[d]	25	ns[d]	23,482
1987	6,279	50[e]	6,329	46	149	10	205	ns[d]	6,534
1988	12,173	230	12,403	63	337	160	560	ns[d]	12,963
1989	25,695	20	25,715	180	31	66	277	ns[d]	25,992
1990	21,346	20	21,366	36	41	6	83	ns[d]	21,449
1991	57,275	185	57,460	300	492	51	843	ns[d]	58,303
1992	29,073	ns[d]	29,073	167	227	181	575	ns[d]	29,648
1993	37,752	ns[d]	37,752	178	370	34	582	ns[d]	38,344
1994	25,173	105	25,278	224	339	0[f]	563	ns[d]	25,841
1995	74,346	39	74,385	127	155	35	317	ns[d]	74,702

[a] Survey conducted by walking portions of the creek.

[b] Sonar counts upstream of river mile 80.

[c] Sonar counts, dates of assessment may vary.

[d] No survey conducted.

[e] Poor survey conditions.

[f] Beaver dam blocking passage of fish downstream of index area.

In the West Cook Inlet Management Unit the Chuitna River is the primary producer of coho salmon. The average harvest in this stream between 1977 and 1994 was estimated at 852 fish which accounts for approximately 62% of the harvest within this management unit (Appendix A11).

Coho salmon sport fishing is permitted throughout the year at most sites. However, portions of several Eastside Susitna Management Unit fisheries are closed to salmon fishing to protect spawning fish. Closures usually include upper reaches of tributaries that are road accessible.

Major tributaries or portions of tributaries within the Susitna River drainage are restricted to unbaited, single-hook artificial lures throughout the year. These regulations are implemented as part of special management regulations for rainbow trout under the Cook Inlet and Copper River Basin Rainbow/Steelhead Trout Management Policy. Additionally, under this policy, only unbaited artificial lures may be used from September 1 through May 15 in all flowing waters of the Susitna River drainage (except the Talkeetna River portion of the Susitna River drainage) except in specific areas when legal burbot fishing gear is utilized. Only unbaited artificial lures may be used in flowing waters of the Talkeetna River drainage from September 1 through June 15.

In the Eastside Susitna Management Unit, the bag and possession limits for coho salmon are three salmon 16 inches or more in length. In the Westside Susitna and West Cook Inlet Management units the bag and possession limits are three coho salmon daily and six in possession.

Susitna River coho salmon are harvested in commercial fisheries located in the Northern and Central Districts of Cook Inlet. In the Northern District, commercial fishing is not permitted within 500 yards of the terminus of the Susitna River and several of the West Cook Inlet Management Unit streams. Commercial fishing is not permitted within 1 statute mile of the terminus of several other West Cook Inlet Management Unit streams including Threemile Creek, Chuitna River, Nikolai Creek and the McArthur River. Significant numbers of Susitna River and West Cook Inlet drainage coho salmon are harvested in the mixed-stock drift net fisheries which occur in the Central District during July and early August.

Recent Fishery Performance

The 1994 recreational coho salmon harvest from the Eastside Susitna, Westside Susitna and West Cook Inlet units was estimated at 38,627 fish (Table 29). The 1994 harvest was the fourth largest harvest on record for these fisheries. The largest harvest on record was 51,830 fish in 1992. The 1994 harvest of 38,627 fish was approximately 40% higher than the 1977 to 1994 average of 27,580 fish. This harvest represented about 60% of the total coho salmon harvested from the NCIMA. Of these three units the Eastside Unit was the highest producer of coho salmon in 1994.

Sonar enumeration of coho salmon at river mile 4 of the Yentna River estimated an above average return of 74,346 coho salmon to the Yentna River drainage in 1995 (Table 38). In 1995 operation of the sonar counters ceased on August 10. This date coincides with the closing dates of the past 10 years of operation. The 1995 sonar count was the highest count on record. The second highest count was 57,275 fish in 1991.

Recent Board of Fisheries Actions

The Board of Fisheries has taken no specific actions with respect to Susitna River coho salmon sport fisheries during recent years. However, 1992 Board of Fisheries action as previously described under Other Knik Arm Management Unit Coho Salmon fisheries will continue to have an effect on coho salmon returns to Susitna River drainages. These actions include: (1) district registration for Northern District set gillnet fishermen, (2) limiting Northern District set gillnet fishermen to regularly scheduled periods after August 15, and (3) restricting the Central District drift gillnet fleet to waters within 1 nautical mile of the west shore of Cook Inlet after August 15.

Current Issues

Allocation of coho salmon between commercial and recreational fisheries remains an issue of controversy.

Issues relating to large scale timber development, recreational river management, and road and boat launch construction are of importance in developing future uses and management strategies for coho salmon in these management units.

The index stream Answer Creek had a perched culvert at the Talkeetna Spur Road crossing since 1986. This perched culvert prevented coho salmon from accessing the majority of spawning habitat. The culvert was repaired and a step-pool fish pass constructed in the spring of 1995. Repair of the culvert and construction of the fish pass allowed coho salmon to readily access Answer Creek spawning habitat upstream of the Parks Highway for the first time since 1986.

Ongoing Research and Management

Sonar and fish wheel enumeration of Yentna River coho salmon is performed by the Division of Commercial Fisheries. This enumeration project is directed primarily toward sockeye salmon and is generally terminated prior to the end of the coho salmon run.

Coho salmon were counted through a weir at mile 17 on the Deshka River in 1995. The weir was operated by the Division of Sport Fish.

In the Eastside and Westside Susitna Management Unit four small Susitna River tributaries continue to be included in the annual coho salmon escapement indices (Table 38). These are Question Creek, Answer Creek, Birch Creek and Rabideux Creek. These coho salmon spawning streams enter the Susitna River drainage between river mile 80 and 85. They are indexed because of their accessibility from the road system. The escapement to these small streams is few in number and often blocked from reaching the index area by beaver dams. It is often unknown if an absence, or very low numbers, of spawning fish in these streams is due to a downstream blockage or is a reflection of abundance trends in the Susitna River drainage.

The Susitna River coho salmon sport harvest and catch is estimated annually by the SWHS. Effort is not estimated specific to a species but across all species for a specific drainage or group of drainages.

Recommended Research and Management Activities

Methods should be established to estimate returns of spawning coho salmon to the Susitna River and West Cook Inlet. Coho salmon stocks of concern are road accessible Eastside Susitna Management Unit streams including Willow, Sheep, Montana, and Birch creeks and the

Kashwitna River. Recent harvests of coho salmon on these drainages are approximately twice the long-term average (Appendix A9).

The weir which was operated on the Deshka River during 1995 will be operated in 1996 if funding is available. Indexing coho salmon spawning downstream of the weir will be attempted in 1996 to help estimate the total return of coho salmon to the Deshka River. Sport harvest estimates of coho salmon on the Deshka River will be subsequently taken from the 1996 SWHS. Wild coho salmon smolt should be marked with coded wire tags to determine exploitation in the Cook Inlet commercial and recreational fisheries.

It is not known if an absence, or low numbers, of spawning coho salmon indexed in small road-accessible Susitna River tributaries are a reflection of instream problems such as blockage by beaver dams or of overall low numbers returning to the Susitna River drainage. Because of this uncertainty, it is important that projects which give a more complete picture of coho salmon abundance in the Susitna River drainage, such as the Deshka River weir, be maintained to assist management of this important recreational species. Additionally, projects such as the Yentna River sonar operated by the Commercial Fisheries Management and Development (CFMD) Division, should be tuned to reliably estimate the escapement of coho salmon to this major Susitna River tributary.

SUBSISTENCE AND EDUCATIONAL SALMON FISHERIES AND FISH CREEK PERSONAL USE FISHERY

Background and Historical Perspective

The Fish Creek commercial set gillnet and personal use dip net fisheries along the northwest shore of Knik Arm were initiated by the Board of Fisheries in 1986 to utilize sockeye salmon surplus to spawning and egg take needs. These fisheries continue annually, contingent upon a projected escapement of 50,000 Fish Creek sockeye salmon. Closure of the commercial fishery after July 26 is mandatory to prevent an excessive interception of coho salmon.

In 1989 the period these fisheries were open to harvest of sockeye salmon was modified to reduce conflict between the two user groups. On projection of a 50,000 sockeye salmon escapement to Fish Creek the commercial fishery is allowed from July 15 through July 26. Fishing periods are Tuesdays and Sundays from 7:00 a.m. to 7:00 p.m. The dip net fishery was established to open July 30. During the 1992 BOF meeting no action was taken regarding the commercial fishery, however, modifications were made to the dip net fishery. The dip net fishery may now open as early as July 24.

The escapement of sockeye salmon into the Fish Creek drainage has been documented since 1936 (Chlupach and Kyle 1990). Recorded escapement of these late-run sockeye salmon ranged from 2,700 fish in 1973 to 307,000 fish in 1940. Since 1968 the escapement of sockeye salmon has ranged from the 1973 low of 2,700 fish to a 1984 high of 192,400 fish (Table 39, Figure 20). Due to declining abundance during the early 1970s, enhancement of Fish Creek sockeye salmon has been conducted since 1975. Hatchery fish are estimated to comprise more than 90% of most returns. The Big Lake state fish hatchery supported the sockeye salmon enhancement program through 1992 using Fish Creek stock as brood (Table 40). This hatchery ceased operation in June 1993. Continued enhancement of Fish Creek sockeye salmon, using Fish Creek stock as

Table 39.-Fish Creek weir sockeye and coho salmon escapements, 1968-1995.

Year	Coho[a]	Sockeye[b]	Dates of Operation
1968	2,088	19,616[c]	1 Jul-31 Jul
1969	4,253	12,456	4 Jul-2 Sep
1970	1,048	25,000	19 Jul-8 Aug
1971	583	31,470	8 Jul-7 Aug
1972	716	6,981	24 Jul-10 Sep
1973	210	2,705	18 Jul-6 Sep
1974	1,154	16,225	8 Jul-6 Sep
1975	1,601	29,882	3 Jul-8 Sep
1976	765	14,032	5 Jul-10 Sep
1977	970	5,183	7 Jul-15 Aug
1978	3,184	3,555	7 Jul-30 Sep
1979	2,511	68,739[d]	9 Jul-29 Aug
1980	8,924	62,828[d]	4 Jul-1 Sep
1981	2,330	50,479[d]	9 Jul-7 Sep
1982	5,201	28,164	12 Jul-8 Sep
1983	2,342	118,797[d]	12 Jul-30 Aug
1984	4,510	192,352[d]	1 Jul-19 Sep
1985	5,089	68,577[d]	8 Jul-29 Aug
1986	2,166	29,800[d]	14 Jul-26 Aug
1987	3,871	91,215[d]	8 Jul-27 Aug
1988	2,162	71,603[d]	7 Jul-9 Sep
1989	3,478	67,224[d]	6 Jul-8 Sep
1990	2,673	48,717[d]	5 Jul-14 Sep
1991	1,297	50,500[d]	9 Jul-12 Sep
1992	1,705	72,108[d]	10 Jul-10 Sep
1993	2,378	117,619[d]	7 Jul-20 Aug
1994	350	100,638[d]	8 Jul-15 Aug
1995	390	115,101[d]	7 Jul-15 Aug
Mean[e]		56,511	

[a] Measured by weir (1968 excepted). Years 1980-1993 include downstream foot surveys upon removing weir.

[b] Weir count.

[c] A counting screen was used instead of a weir.

[d] Years hatchery sockeye salmon contributed to the escapement.

[e] The mean coho salmon escapement is not estimated because in many years of record the weir was removed before the run was complete.

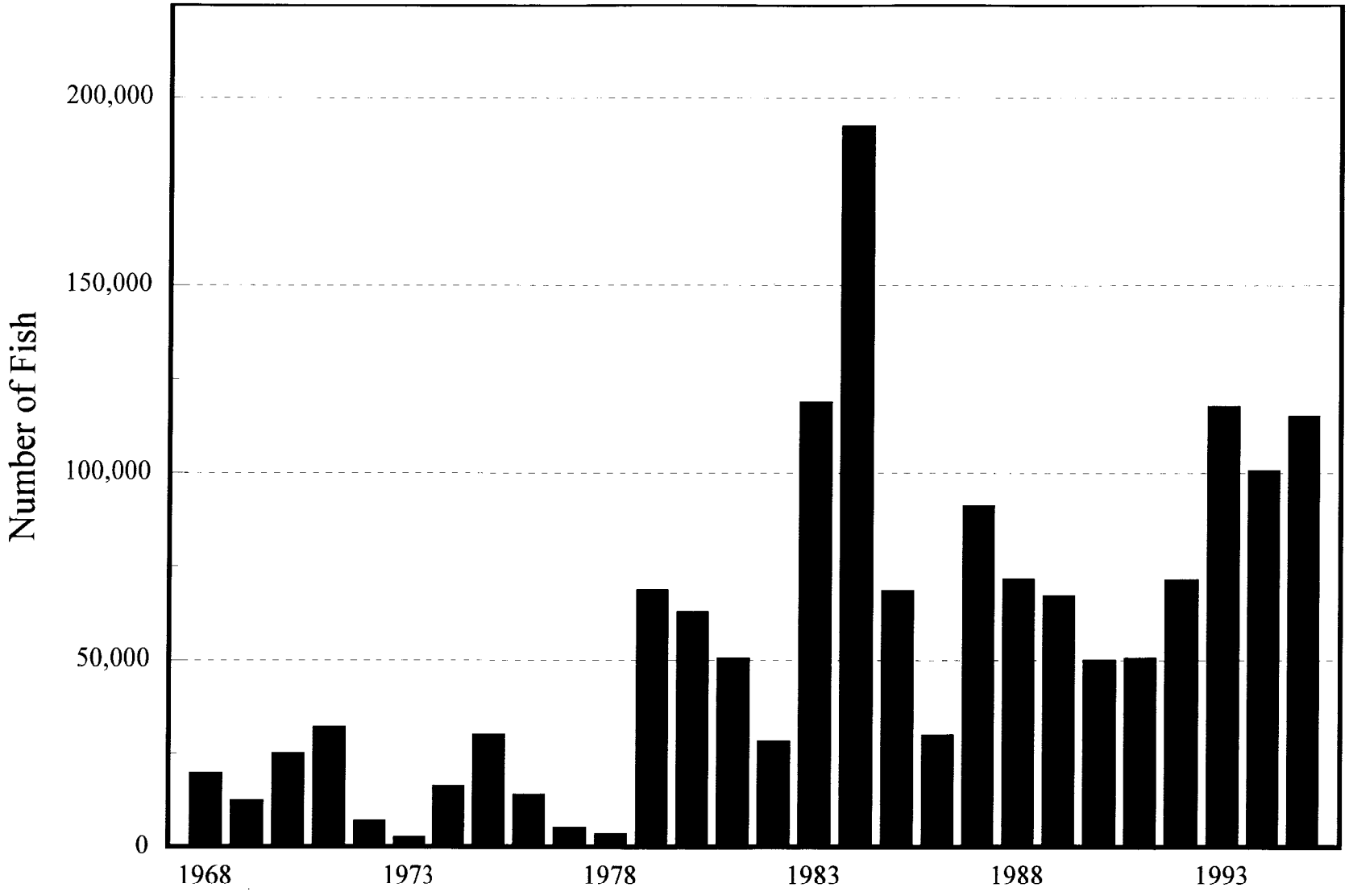


Figure 20.-Fish Creek sockeye salmon escapement, 1968-1995.

Table 40.-Big Lake Hatchery (1975-1992) and Eklutna Hatchery (1995) sockeye salmon fry releases into the Big Lake drainage by brood year, 1975-1995.

Brood Year	Eggs Incubated	Fry Released	Egg/Fry Survival	Number Marked	Size (gm) At Release
1975	180,300	71,168	39.5%	0	0.15
1976	10,034,013	7,686,382	76.6%	72,673	0.15
1977	8,748,867	5,739,010	65.6%	66,153	0.13
1978	9,832,726	0	0.0%		
1979	5,053,808	806,047	15.9%	0	0.15
1980	4,699,733	3,967,941	84.4%	0	0.14
1981	5,662,004	4,263,356	75.3%	0	0.17
1982	8,624,662	6,601,409	76.5%	0	0.16
1983	9,294,426	7,362,000	79.2%	0	0.15
1984	16,210,000	12,430,000	76.7%	18,835	0.15
1985	21,550,000	15,000,000	69.6%	18,120	0.20
1986	17,500,000	11,866,000	67.8%	19,613	0.20
1987	20,300,000	14,492,000	71.4%	20,085	0.15
1988	19,700,000	13,205,848	67.0%	24,848	0.15
1989	14,835,000	10,815,319	72.9%	24,319	0.20
1990	14,734,000	10,037,290	68.1%	22,290	0.24
1991	7,357,000	3,111,000	56.4%	0	0.25
1992	10,330,000	4,586,000	59.2%[a]	0	0.22
1993	9,000,000	5,000,000	90%[b]	0	0.43
1994	7,700,000	5,000,000	81%[b]	0	0.40

[a] Includes 1,534,000 fry transferred to Eklutna hatchery.

[b] Additional fry retained for smolt program.

brood, will use the Eklutna fish hatchery, a private hatchery operated by Cook Inlet Aquaculture Association located on the Knik River in the Eklutna powerplant tailrace.

Fish Creek sockeye salmon have long been utilized in commercial and subsistence fisheries (Engel and Vincent-Lang 1992). A subsistence fishery was operational through 1970. In 1971 the Knik Arm subsistence fishery was closed because of declining sockeye salmon escapements into Fish Creek. It was reopened in 1984 and 1985 then closed again in 1986. The Upper Cook Inlet Subsistence Management Plan provided for a subsistence set gillnet fishery in Northern Cook Inlet waters in 1991, 1992 and 1994 (Table 21). Subsistence set gillnet fishing was allowed for a total of 17 days between May 21 and September 28. A subsistence set gillnet fishing day in Northern Cook Inlet was from 8:00 a.m. until 8:00 p.m. The threat of a court ordered closure of this subsistence fishery for the 1995 season caused the BOF to take action to allow the fishery to proceed as a personal use fishery.

The villages of Eklutna and Knik were granted educational permits in 1994 and 1995 to fish set gillnet sites for salmon at one site near each village. A total of 1,000 salmon by each village was allowed. The fisheries ran from June 1 to September 30.

Recent Fishery Performance

In 1995 the Fish Creek personal use dip net fishery was restricted to the waters of Fish Creek. In 1995 fishing commenced at 5:00 a.m. July 26 and ended at 12 midnight on August 8. During this period the fishery was closed on July 28, August 1 and August 4 to allow for escapement into the creek upstream of the area open to dip netting. This action allowed for spawning escapement from all segments of the return.

An estimated 16,012 sockeye salmon and 1,336 coho salmon (retention of coho salmon was allowed for the first time in this fishery in 1993) were harvested during the 1994 dip net season (Table 41). Harvest estimates are not yet available for the 1995 season. However, it is anticipated to be similar to 1994 harvest levels.

During the 1995 season, 115,101 sockeye salmon entered Fish Creek to spawn (Table 39). The weir on Fish Creek was operated from July 7 through August 14. The sockeye salmon escapement goal of 50,000 fish was attained on July 23. Run timing for Fish Creek sockeye salmon is such that the peak of the return occurs as coho salmon are starting to move into the drainage. Only 390 coho salmon had passed the weir before it was removed (Table 39).

Subsistence fishing in Knik Arm was prohibited during the 1993 season as most waters of Cook Inlet were determined by the Board of Fisheries to be in the nonsubsistence zone. This decision was reversed by the courts prior to the 1994 season and subsistence gillnet fishing was again allowed. During 1995 this subsistence fishery was replaced with a personal use fishery. The Upper Cook Inlet personal use gillnet harvest for 1995 totaled 33,239 salmon of which 21,445 were sockeye salmon, 8,029 were coho salmon, 735 were pink salmon, 2,093 were chum salmon, and 937 were chinook salmon (Table 21). The commercial fishery in the Fish Creek special harvest area harvested 19,477 sockeye salmon and 1,999 coho salmon during the 1995 openings (Table 41). A portion of the sockeye salmon harvested in the Knik Arm commercial fishery is from other Knik Arm drainages such as Cottonwood and Jim creeks, but the large majority of the sockeye salmon harvest is bound for Fish Creek.

Table 41.-Fish Creek salmon harvests, by commercial set gillnet and personal use dip net, 1987-1995.

	Commercial Gillnet						Personal Use Dip Net				
Year	Sockeye	Coho	Chum	Pink	Chinook	Total	Sockeye	Coho	Chum	Pink	Total
1987	24,090	2,043	403	264	0	26,800	2,200			2,200	
1988	38,251	11,604	325	591	9	50,780	3,000			3,000	
1989	47,925	6,075	4,979	545	4	59,528	5,000			5,000	
1990	23,450	5,708	5,308	696	4	35,166	6,500			6,500	
1991	10,459	1,630	961	21	0	13,071	14,369		549	567	15,485
1992	10,748	1,817	1,289	573	0	14,427	19,002		607	678	20,287
1993	47,751	831	990	29	0	49,601	37,224	973	503	2,068	40,768
1994	7,528	809	357	141	0	8,835	16,012	1,336	248	632	18,228
1995	19,477	1,999	1,018	72	5	22,571	No data available				
Mean	25,520	3,613	1,737	326	2	31,198	12,471	973	553	2,859	25,513

During 1995 a total of 7,471 coho salmon were reported to have been harvested in the personal use gillnet fisheries in the Northern District, including Knik Arm waters (Table 21). Coho salmon bound for Knik Arm streams were intercepted in this personal use fishery.

The Eklutna Village harvested 155 salmon by educational permit in 1995 of which 55 were sockeye, 37 coho, 42 chum, 6 pink and 14 chinook salmon. The Knik Village harvested a total of 28 salmon of which 5 were chinook, 21 sockeye, 1 coho and 1 chum salmon.

Management Objectives

The management objective of the Fish Creek personal use fishery is to allow sockeye salmon from the early, middle, and late portions of the return to be included in the spawning escapement while harvesting fish in excess of the 50,000 fish escapement goal.

Recent Board of Fisheries Actions

During the November 1992 BOF meeting most waters of Cook Inlet were found to be in a nonsubsistence zone and the Upper Cook Inlet subsistence fishery was terminated. Additionally, the Cook Inlet Personal Use Salmon Dip Net Fishery Management Plan pertaining to the Fish Creek dip net fishery was modified as follows:

1. The fishery will open by emergency order after July 23 on Saturdays, Sundays, and Wednesdays to the taking of salmon, other than chinook salmon, provided the spawning escapement of sockeye salmon into Big Lake drainage is projected to exceed 50,000 fish;
2. Additional fishing time can be established by emergency order, provided that no more than 3 consecutive days of fishing time is allowed without a minimum of 1 day closure if escapement into Fish Creek warrants such action;
3. The area to be open to harvesting salmon by dip net includes waters upstream from a department marker located at the mouth of Fish Creek to a department marker located approximately one-quarter mile upstream of the Knik-Goose Bay Road (dipnetting is no longer allowed in the marine waters of Knik Arm),
4. The daily bag and possession limits are six salmon, other than chinook salmon, not in addition to the daily sport fish bag and possession limit; and
5. The fishery shall close the second Friday in August, or earlier by emergency order if the harvest of coho salmon becomes excessive in department opinion.

No action was taken regarding the sport and commercial fisheries.

Prior to the 1995 season court action threatened to close the subsistence fishery allowed by the Upper Cook Inlet Subsistence Salmon Management Plan. The BOF took action to allow the fishery to proceed as a personal use fishery during the 1995 season.

The next BOF meeting addressing the Fish Creek personal use salmon fisheries will be in February 1996.

Current Issues

Much of the land adjacent to the fishery is under private ownership. There is annual conflict between fishery participants and land owners. Posting of land owned by private land owners

could effectively curtail the personal use fishery as it now exists, and require managers to restructure public participation in the fishery.

Substantial short-term damage to the marsh area near the mouth of Fish Creek and litter accumulation occurs due to the large number of people participating in the personal use fishery. This environmental damage and litter accumulation is the source of increasing public and land owner comment. During the 1994 and 1995 season the department provided toilets and a dumpster to address this issue.

Ongoing Research and Management Activities

Salmon escapement is monitored by a weir located approximately 3 miles from the outlet of Fish Creek into Knik Arm. This sockeye escapement evaluation program is paid for by the Commercial Fisheries Management and Development Division and operated by the Division of Sport Fish. The personal use fishery harvest is estimated by the SWHS. The Fish Creek drainage is scheduled to be stocked annually with sockeye salmon fry from the Eklutna Hatchery.

Recommended Research and Management

Department markers at the mouth of Fish Creek placed during the 1995 season reduced the confusion with fishery participants concerning the legal fishing area. Placement of signs to inform participants of fishery regulations and fish identification techniques will continue. As with most fisheries in this management area, increased enforcement would provide for a more orderly fishery.

STOCKED LAKE FISHERIES

Background and Historical Perspective

Currently 67 lakes in the NCIMA are stocked on an annual, biennial, or triennial basis, including one research lake that is closed to fishing. The 67 stocked lakes range in size from 2.4 to 362 surface acres (Appendix C1).

The area stocking program began in 1952 when two lakes received 22,000 rainbow trout fry. Although eight species of salmonids have been planted since 1952, rainbow trout, coho salmon and Arctic grayling have become the primary species used in the stocking program. Steelhead/rainbow trout from the Karluk River (Kodiak) and four strains of Alaska rainbow trout (Naknek River, Talarik Creek, Swanson River and Big Lake) as well as rainbow trout from federal and private hatcheries located in the states of Idaho, Montana, Oregon and Washington have been stocked. Landlocked salmon fisheries have been supported by coho salmon from Washington State, at least nine Alaskan egg take sources and chinook salmon from three Alaskan sources. Since 1979 only native Alaskan fish have been stocked in the NCIMA. Arctic grayling egg take sources have been Junction Lake, Tolsona Lake and Moose Creek. Arctic char, originating from egg takes at Aleknagik Lake, and lake trout from Paxson Lake were first stocked in 1988.

The final egg take from Big Lake strain rainbow trout brood stock at Ft. Richardson Hatchery took place in 1993. All resulting fingerling were stocked in Big Lake drainage lakes and all remaining brood stock were stocked in Anchorage area landlocked lakes and in Big Lake. Swanson River strain rainbow trout are the sole rainbow trout brood stock source remaining at Ft. Richardson Hatchery. Beginning in 1994, Big Lake drainage system lakes having

intermittent outlets have been stocked with triploid all-female Swanson River strain rainbow trout.

In most cases stocked landlocked lakes represent "new" fisheries because game fish were not present before stocking occurred. Stocked lakes benefit anglers and recreational support industries by providing diverse, year-round fishing opportunities and by diverting angling pressure from natural stocks. The majority of the stocking is directed toward road-accessible lakes that tend to draw entire family groups for some combination of fishing, camping, picnicking, boating, and ice skating.

Rainbow trout appear to be the species preferred by most anglers. A survey of anglers fishing stocked lakes in the NCIMA in 1977 (Watsjold 1978) revealed that 70% preferred to fish for rainbow trout, 19% desired landlocked coho salmon and 11% listed Arctic grayling as their choice. Rainbow trout comprised 59% of all fish stocked in landlocked lakes within the NCIMA during the period 1991 through 1995. Annual releases of all species during 1993-1995 ranged from 1,186,606 to 1,821,131 (Appendix C1).

Ninety-five percent of the rainbow trout released into NCIMA waters during the period 1993-1995 were fingerlings. Most fingerlings weighed between 1 and 2 grams and were released during July. By June of the year following introduction, fingerlings at age 1 will typically range from 3 to 6 inches in length, at age 2 from 6 to 11 inches, at age 3 from 11 to 16 inches, and at age 4 from 16 to 20 inches in length. Approximately 70% to 80% of the rainbow trout harvested from stocked lakes are age 2 and about 15% to 20% are age 3. Few stocked rainbow trout exceed age 4 and relatively few rainbow trout achieve harvestable size prior to age 2.

Catchable size rainbow trout, weighing about 100 grams, are stocked to supplement rainbow trout production resulting from fingerling plants. These larger fish provide angling opportunities in nonproductive lakes and help maintain good catch rates in heavily fished lakes. Usually less than 6% of the rainbow trout stocked in the NCIMA are catchable size at introduction.

Coho salmon are normally stocked in May at about 3 to 5 grams each. These fish achieve a harvestable size (6 to 11 inches) at age 1 the year following introduction. Most coho salmon are either harvested or die after becoming sexually mature by age 3. Stocked salmon support important winter fishing opportunities within the NCIMA.

Arctic grayling are stocked as fingerlings, weighing 3 to 5 grams, in September. Arctic grayling normally recruit into the harvest by age 2.

Although the contributions from the landlocked lake stocking program have been significant to date, it is important to recognize that poor survival of stocked fish has also been documented. A research investigation has accompanied development of the area's stocking program since the early 1970s. The primary objective of this research has been to develop cost-effective stocking practices that provide both expanded and diverse fishing opportunities. Lake stocking research has been directed toward but not limited to the following: evaluation and selection of rainbow trout brood stock; development of effective stocking densities and size of stocked fish for various lake environments; establishment of optimal time and frequency of stockings in various landlocked lake environments; evaluation of sterile rainbow trout for stocking lakes that have open or intermittent linkages with drainages that support wild rainbow trout; and currently,

evaluation of all-female diploid rainbow trout to eliminate high mortality associated with spawning males.

Recent Fishery Performance

A total of 60 lakes were stocked with 780,014 game fish in 1995 (Appendix C1). Forty-eight of these lakes were located in the Knik Arm Management Unit and the remainder in the Eastside Susitna Management Unit. Releases in 1995 included 539,390 rainbow trout, 101,260 coho salmon, 35,954 chinook salmon, 79,110 Arctic grayling, and 24,300 Arctic char. Twenty-three lakes were stocked with more than one species of fish in 1995. Stocking locations, species, numbers of fish and fish size are listed in Table 17.

The SWHS (Howe et al. 1995) estimated that 32,975 angler-days of participation resulted from the area's landlocked stocking program in 1994. Fishing effort associated with lakes having both stocked and indigenous game fish is not included in estimates of participation associated with lake stocking. The 1994 catch from stocked landlocked lakes included an estimated 39,338 rainbow trout of which 30% were harvested, 18,202 landlocked salmon (57% were harvested), and 9,202 Arctic grayling (23% were harvested). Rainbow trout from stocked lakes represented 28% of all rainbow trout caught and 25% of the entire harvest of this species from the NCIMA.

The Kepler Lake Complex, consisting of nine stocked lakes, supported 5,128 angler-days of effort, and Finger Lake supported 9,434 angler-days of effort in 1994. Collectively, these two stocking sites yielded 44% of the effort associated with stocked landlocked lakes within the NCIMA (Howe et al. 1995).

The cost associated with each angler-day of participation created by landlocked lake stocking was estimated to be $5.60 in 1994. Cost per fish caught in 1994 was estimated at $2.75, while the cost for each fish harvested was $7.60. Costs related to producing and delivering fish to stocked lakes within the NCIMA in 1993 were approximately $1.50 for each catchable rainbow trout, $0.06 per rainbow trout fingerling, $0.09 per Arctic grayling fingerling, $0.0015 per Arctic grayling fry and $0.06 per salmon fingerling.

Management Objectives

The primary objective of this program is to provide additional fishing opportunities in a cost effective manner on a sustainable basis by stocking lakes with game fish that are indigenous to Alaska. An additional objective of the program is to insure that stocking does not negatively impact wild stocks or other fisheries. All stocking is conducted in accordance to guidelines set forth in the Statewide Stocking Plan for Recreational Fisheries.

Recent Board of Fisheries Actions

During the fall of 1992 the Board of Fisheries restricted three catch and release lakes ("X", Long, and Wishbone) to allow fishing only during the open-water season, May 1 through October 30. The new regulations took effect in 1993. Board of Fisheries action in 1992 also resulted in a reduction of the rainbow trout bag limit in Big Lake to two fish per day, only one of which may be 20 inches or more in length.

Current Issues

The cost associated with providing an angler-day of stocked-lake fishing averaged $3.28 over the last 5 years. During the period of 1992 through 1994 an average 76,567 stocked fish have been

caught annually and 35% of that catch has been harvested. Increased stocking levels have not produced parallel increases in participation. Lake stocking research indicates the area's stocking program is making more harvestable fish available than ever before but anglers are not taking full advantage of these fish.

Why has increased stocking not produced proportionate increases in participation? Has the current level of stocking exceeded demand for stocked lake fishing? Are anglers unaware of stocked lake fishing opportunities? Is participation hindered because of poor access, or lack of support facilities at many stocked lakes? Does the SWHS adequately reflect year-round participation of anglers fishing Matanuska-Susitna Valley stocked lakes? Finding answers and solutions to these issues will be essential if stocking in the NCIMA is to function in a cost-effective manner.

Ongoing Research and Management Activities

Landlocked lake research in 1995 was directed at continuing to compare survival and growth of diploid (normal) mixed-sex and all-female diploid rainbow trout fingerling. Preliminary data indicate that 2 years after introduction into a lake all-female rainbow trout survival was approximately equal to the average survival of diploid mixed-sex rainbow trout and the mean length of all-female fish was approximately equal to the mean length of diploid fish. If the all-female trout have survival and growth through age 2 better than or equivalent to mixed-sex trout, the Ft. Richardson Brood Stock Development Center may change both rainbow trout brood stock and catchable and fingerling production to all-female fish. As a significant portion of male rainbow trout mature and die at age 2 and age 3, fewer fish would need to be maintained with an all-female brood stock.

Johnson Lake was stocked in June of 1994 with equal numbers of diploid (normal) mixed-sex and triploid (sterile) Little Susitna River strain coho salmon fingerling. Data collected in September of 1995 to estimate the proportion of the population comprised of each type of fish and compare mean length indicated a combination of 25% triploid fish and 75% diploid fish with the mean length of triploid fish 7% less than diploid fish. If triploid coho can be developed in a cost-effective manner, the fish could be stocked in lakes that have open or intermittent linkages with drainages that support wild salmon. Also, if triploid coho do not mature and die at 3 years as do most diploid coho, they would be available to the fishery longer and provide larger fish.

Evaluation of stocked lakes on a 5-year rotational sampling schedule began in 1995. Fourteen lakes were sampled in the spring of 1995 and eight lakes were sampled in the fall. Data collected from sampling will be used to evaluate stocking plans and update the 1996 Matanuska-Susitna Valley Lakes Fishing Forecast.

Recommended Research and Management Activities

Current levels of stocking within the NCIMA should not increase during the next several years. Substantial effort should be directed toward increasing angler participation at stocked lakes by improving the public's awareness of available fishing opportunities. Annual updating of the area's stocked lakes brochure and expanded distribution of this popular pamphlet may help improve the public's awareness of fishing opportunities afforded by stocked lakes. Providing the brochure to visitor centers, sporting good outlets and license vendors should become an annual

objective of the stocked lakes program. An additional objective of the program should be to improve and maintain public access, parking, and signing at stocked lakes.

The areawide stocking program should continue to be evaluated annually in terms of the cost per angler-day of participation, cost per fish caught, and cost per harvested fish. All stocked lakes should continue to be evaluated on a rotational basis. When coupled with public input, these data provide the basis for modifying stocking strategies.

Evaluation of the stocked lakes program depends heavily on harvest and effort data from the SWHS. In fact, assessment of the cost effectiveness of various stocking strategies depends almost totally upon the SWHS because onsite creel surveys to estimate seasonal effort and harvest have not been performed.

RAINBOW TROUT FISHERIES

Background and Historical Perspective

NCIMA rainbow trout harvests have ranged from 28,000 to 75,000 fish and averaged 46,303 fish during the years 1977 through 1994 (Mills 1977-1994, Howe et al. 1995) (Table 42). This harvest accounts for 39% and 29% of the average harvest within Region II and the state, respectively. The Knik Arm Management Unit harvest, of which a large percentage is a result of the stocked lake program, accounts for approximately 68% of the total NCIMA harvest. The Westside Susitna and the Eastside Susitna Management units have accounted for 17% and 14% of this harvest, respectively, with the West Cook Inlet Management Unit accounting for less than 1%. Since 1990 the SWHS has also estimated the catch of rainbow trout. From 1990-1994 the catch averaged approximately 138,800 rainbow trout (Mills 1991-1994, Howe et al. 1995) (Table 42). The Knik Management Unit has also dominated the catch (59%), with Westside Susitna (23%) and Eastside Susitna (17%) accounting for the majority of the remainder.

The Board of Fisheries attempted for several years to accommodate a wide array of individual requests for regulatory reform to provide for conservative rainbow trout management. In 1984 they determined that a comprehensive trout policy was needed. A 13-member citizen planning team working with the department and the angling community developed a draft management policy over a 2-year period.

During the fall of 1986 the Board of Fisheries officially adopted this plan as a management policy for Cook Inlet and Copper River rainbow trout. The policy provides a systematic approach for selecting fishery regulations as well as a process for rational identification of waters for special management (ADF&G 1986). The Board of Fisheries has used the policy since 1986 to implement regulations for rainbow trout within the NCIMA (Engel and Vincent Lang 1992).

Even before the policy was developed, the management of Susitna River trout was becoming conservative. Bag and possession limits, for example, were 10 rainbow trout prior to 1982. Beginning in 1982 the bag and possession limits dropped to five rainbow trout of which only two could be 20 inches or more in length. In 1983 the limit was further reduced to allow just one fish 20 inches or more in length. Starting in 1987 and continuing to the present, nearly all streams within the Susitna River drainage have been regulated according to the conservative yield concept of the rainbow trout plan. This management concept strives to maintain historical size and age compositions and abundance levels for wild trout. Bag and possession limits under this

Table 42.-Northern Cook Inlet Management Area recreational catch and harvest of rainbow trout by management unit, 1977-1994.

Year	Northern Cook Inlet Management Area										Region II		Statewide	
	Knik Arm Unit		Eastside Susitna Unit		Westside Susitna Unit		West Cook Inlet Unit		Total		Harvest		Harvest	
	Catch[a]	Harvest	Catch[a]	Harvest	Catch[a]	Harvest	Catch[a]	Harvest	Catch[a]	Harvest	Number	% NCIMA	Number	% NCIMA
1977		18,615		5,225		7,472		958		32,270	80,345	39.8	94,307	33.9
1978		23,139		5,930		12,295		723		42,087	107,243	39.1	120,231	34.9
1979		24,843		9,463		12,555		1,063		47,924	129,815	36.7	139,390	34.2
1980		29,368		6,715		12,785		560		49,428	126,686	38.9	153,476	32.1
1981		41,749		8,813		11,296		1,734		63,592	149,460	41.2	178,613	34.5
1982		30,729		7,536		11,465		398		49,948	142,579	34.8	173,242	28.6
1983		26,421		9,639		9,248		871		46,184	141,705	32.5	168,677	27.3
1984		26,418		7,656		8,129		698		42,851	128,649	33.3	170,117	25.2
1985		46,431		7,872		8,114		902		63,319	142,316	44.5	181,991	34.8
1986		27,690		8,061		6,668		212		42,631	114,873	37.1	152,855	27.9
1987		24,663		6,647		8,020		579		39,909	101,397	39.4	138,698	28.8
1988		58,627		7,622		8,058		618		74,907	155,960	48.0	241,831	40.0
1989		44,518		4,972		4,928		534		54,952	127,444	43.1	209,961	26.2
1990	98,720	30,699	21,806	5,008	33,511	3,960	2,340	438	156,377	40,122	122,987	32.6	191,809	20.9
1991	88,645	39,636	26,329	7,854	46,839	4,526	1,290	404	163,103	52,544	127,492	40.7	205,642	25.2
1992	85,331	27,995	19,915	3,948	23,850	2,028	760	150	129,856	34,121	97,730	34.9	139,973	24.4
1993	69,635	21,565	24,240	3,713	29,911	2,481	1,411	105	125,197	27,864	82,312	33.9	136,681	20.4
1994	70,255	22,446	23,619	3,658	25,157	2,526	593	177	119,624	28,807	76,384	37.7	112,261	25.6
Mean	82,517	31,436	23,182	6,685	31,854	7,587	1,279	618	138,831	46,303	119,743	38.7	161,653	28.8
Mean % of NCIMA	59	68	17	14	23	17	1	1	100	100				

[a] Catch estimates available beginning in 1990.

concept are two trout, of which only one may be 20 inches or more in length. This management strategy also requires the use of unbaited artificial lures in all flowing waters from September 1 through May 15 to enhance survival of released fish at the time when trout are often a targeted species. This regulatory scheme attempts to allow a modest portion of the annual trout production to be removed from most populations while the rest are recycled.

The majority of Cook Inlet rainbow trout fisheries in flowing waters are additionally managed under a seasonal limit of two rainbow trout over 20 inches. To assure compliance with this regulation, anglers must, immediately upon harvesting a trout over 20 inches, record that harvest on the back of their license or on a harvest record.

A major portion of the Eastside Susitna Management Unit has been managed for trophy-size trout (trout over 20 inches) since 1987. This fishery encompasses all drainages of the Susitna River upstream from the junction of the Susitna and Talkeetna rivers to Devil's Canyon. Under this strategy, only one trout 20 inches or more in length is allowed daily with a two trout over 20 inch seasonal limit. Small trout must be released immediately. An unbaited, single-hook lure requirement complements this strategy.

Major portions of three of the Susitna River drainage's best trout streams joined the Talachulitna River as catch-and-release waters starting in 1987. The Talachulitna River had previously become Alaska's first catch-and-release trout fishery in 1977. No-kill strategies now govern most of the Lake Creek drainage, much of the Deshka River, and the Fish Creek drainage located within the Talkeetna River drainage. Unbaited, single-hook lures are mandatory in all catch-and-release waters. Catch-and-release strategies were adopted to perpetuate quality fishing rather than protect or rebuild depressed stocks (Engel and Vincent-Lang 1992).

Stocked landlocked lakes make up the majority of waters that fall under the maximum sustained yield management concept. Bag and possession limits under this management concept are five trout. Although stocked lakes are primarily managed for put-and-take fisheries, three stocked lakes have been established for catch-and-release fishing through utilization of unbaited artificial lures, and closed November 1 to April 30 to prohibit ice fishing.

Wild trout are not supplemented with hatchery trout in the Susitna River drainage. Public testimony during the development of the rainbow trout plan suggested little interest in the use of hatchery fish to augment wild stocks. In fact, many participants in the planning process expressed strong opposition to any hatchery assistance for wild Susitna River trout.

A description of the Susitna River drainage as well as a discussion of access routes within the area have previously been presented in overviews pertaining to Susitna River chinook salmon fisheries.

According to the SWHS, the harvest of Susitna River (Eastside and Westside Susitna Management Units) rainbow trout has ranged from 5,976 to 22,018 fish and averaged 14,266 fish annually during the period 1977 through 1994. Approximately 53% of the trout harvest from the Susitna River drainage has been from Westside Susitna Management Unit tributaries.

The Deshka River, Lake Creek and Alexander Creek generally provide the largest harvests among Westside Susitna Management Unit fisheries (Appendix A34). Willow Creek, Sheep

Creek, Montana Creek and the Talkeetna River drainage are the major rainbow trout fisheries in the Eastside Susitna Management Unit (Appendix A33).

Studies have been conducted on rainbow trout stocks of the Deshka River, Lake Creek and Talachulitna River since 1989 (Bradley 1990 and 1991), including the Kashwitna River since 1991 and Peters Creek since 1992 (Rutz 1992 and 1993). Assessment of the age and length characteristics of these stocks has been the primary focus of these investigations. Onsite creel surveys were also conducted at Lake Creek during 1988 and 1989 (Vincent-Lang and Hepler 1989). Significant differences in age composition and mean length-at-age statistics occurred among Susitna River tributaries sampled during 1989-1992 (Rutz 1992 and 1993). Rainbow trout tagged during 1991 and 1992 indicated a low occurrence of trout over 510 mm in length, the size limit defined in the Cook Inlet and Copper River Rainbow/Steelhead Trout Management Policy for trophy trout. This lack of adequately sized fish, combined with the relatively slow growth rate of Susitna River basin trout in comparison to other Alaskan waters containing trophy trout, suggests that these Susitna River rainbow trout stocks are not viable candidates for management as trophy fisheries under the Cook Inlet rainbow trout management policy (Rutz 1992).

Recent Fishery Performance

A harvest of 6,184 rainbow trout in 1994 was the second lowest on record for the Eastside and Westside Susitna management units and represents less than half of the historical mean harvest for this stock. Since 1989 there has been a trend of reduced harvests for Susitna River rainbow trout. This trend is not totally understood but the increasingly conservative regulations that govern major rainbow trout populations within the drainage, as well as a growing desire among anglers to release the majority of their trout catch, is at least partially responsible.

The catch during the period 1990 through 1994 for the Eastside Susitna Management Unit ranged from 20,000 to 26,000 and averaged 23,000 fish (Table 42). The Westside Susitna Management Unit catch ranged from 24,000 to 47,000 and averaged 32,000. The percentage of the total catch harvested in Eastside and Westside management units ranged from 15%-30% (average 21%) and 8%-12% (average 10%), respectively (Table 42).

During 1994, Willow Creek in the Eastside Susitna Management Unit produced the largest rainbow trout harvest from the Susitna River drainage (Appendix A33). An estimated 1,161 fish were harvested from Willow Creek's catch of 4,673 rainbow trout. The second largest harvest occurred at Little Willow Creek where 337 fish were kept from a catch of 2,024 (Howe et al. 1995).

During 1994 Lake Creek, a Westside Susitna Management Unit fishery, produced an estimated 714 fish harvest from a catch of 10,387 (Appendix A34). The Deshka River, also a Westside Susitna tributary, yielded a rainbow trout harvest and catch of 415 and 3,345 fish, respectively. The Talachulitna River drainage, which is a catch-and-release fishery, produced a catch of 6,646 rainbow trout (Howe et al. 1995). In 1994 the rainbow trout harvests in all major Susitna River fisheries were well below their long-term average.

The vast majority of the rainbow trout harvest in the Knik Arm Unit resulted from stocked lake fisheries (Appendix A32). These fisheries have been discussed previously in the Stocked Lake Fisheries section of this report.

Management Objectives

Past and current management of Susitna basin rainbow trout followed the guidelines set forth in the Cook Inlet and Copper River Basin Rainbow/Steelhead Trout Management Policy.

Recent Board of Fisheries Actions

During the November 1992 BOF meeting, the rainbow trout bag and possession limit in Big Lake was reduced to two daily and in possession. Long, X, and Wishbone lakes, which are catch-and-release stocked lakes, were closed to sport fishing from November 1 through April 30. The north fork of the Kashwitna River was established as a special management unit for rainbow trout. Only single-hook, unbaited artificial lures may be used in the north fork of the Kashwitna River and rainbow trout may not be possessed or retained.

A regulation was also established which requires that only unbaited artificial lures may be used in all flowing waters of the Susitna West-Cook Inlet area (except when fishing for burbot using legal burbot gear). This regulation is effective from September 1 through May 15 except in areas with special regulations in effect. Areas with regulations for catch-and-release and trophy fish management require the use of unbaited artificial lures year round and rainbow trout may not be possessed or retained.

The rainbow trout regulations in Lake Creek were modified, requiring that in all flowing waters of the Lake Creek drainage upstream from its confluence with the Yentna River to a department marker located one-quarter mile upstream from Bulchitna Lake, rainbow trout may not be possessed or retained from August 15 through May 15. Only single-hook unbaited artificial lures may be used in this area during this period.

Current Issues

Issues concerning NCIMA wild rainbow trout include the need for evaluation of clearwater streams and tributaries in the greater Mat-Su urban area. Little information is available regarding the resident fish populations in most of these systems. With increased pressure from a growing urban population it is imperative to understand the population dynamics of these systems to effectively manage the resource.

Ongoing Research and Management Activities

Harvest trends for rainbow trout are measured by the SWHS.

During the fall of 1995, the Cottonwood Creek drainage, including 9 lakes, was sampled intensively, using fyke nets and minnow traps. Habitat of the drainage from the source to the ocean was mapped. All fish captured were counted and measured. Scale samples were taken from rainbow trout. Populations of rainbow trout in various age classes were found, along with a large population of juvenile coho salmon. The data collected will provide an index for future management of the fishery.

Recommended Research and Management Activities

Age and length assessment of primary rainbow trout fisheries including, but not limited to the Talachulitna River, Lake Creek, the Deshka River, Willow Creek and Clear Creek (Talkeetna River) should be collected over a period of years to determine if a trend of variation in age and size composition exists. Methods need to be developed to measure the abundance of rainbow trout in key fisheries to determine if a conservation problem exists.

Management staff should continue to participate in land and water use planning within the Susitna River drainage.

An evaluation of resident fish populations in NCIMA clearwater streams and tributaries should be continued, following the Cottonwood Creek study. The relative health of rainbow trout fisheries and drainages including, but not limited to Wasilla Creek, Willow Creek, Little Willow Creek, Sheep Creek, Goose Creek, Montana Creek and Kashwitna River should be determined, along with the size, age structure and movement of the resident fish populations.

Bag and possession limits for all wild rainbow trout stocks need to be established at two fish.

NORTHERN PIKE FISHERIES

Background and Historical Perspective

Northern pike are not indigenous to the NCIMA but are thought to have been introduced into Bulchitna Lake of the Susitna River drainage during the early 1950s. Since then, northern pike have been reported in over 50 lakes and more than a dozen tributaries of the Susitna River (Appendix G) (D. Rutz, Alaska Department of Fish and Game, Palmer, personal communication). Prior to 1992 several of these lakes consistently produced fish in the trophy class range (greater than 42.5 inches or 1,080 mm). Northern pike weighing up to 20 lbs were commonly caught with fish occasionally weighing over 30 lbs (D. Rutz, Alaska Department of Fish and Game, Palmer, personal communication).

The harvest of northern pike in the NCIMA numbered less than 200 fish, which barely accounted for 1% of the statewide harvest of northern pike when the SWHS was initiated in 1977 (Mills 1979) (Table 43). Northern pike harvests slowly increased through 1983 when the harvest remained less than 1,000 fish. Since 1984 the harvest of northern pike has greatly increased. The average harvest during 1984-1987 was 1,916 while, 1988-1991 averaged 3,946 fish (Figure 21) (Mills 1985-1992). The harvest of northern pike increased at an annual rate of about 23% from 1977 through 1991. The highest reported harvest of 6,640 fish occurred in 1991. Though northern pike harvests have not increased since 1991 the catch has nearly doubled. This indicates that the size of harvested pike may be decreasing. This became evident in 1994 when the overall catch dropped to a 5 year low of 8,252 fish, a decrease of nearly 76% from the previous year's 34,218 catch (Howe et al. 1995). This decrease in both catch and harvest is probably the result of previous years' overexploitation by the sport fishery due to northern pike's voracious feeding habits. Anglers prefer to fish for large pike. Once the large (old) fish have been removed anglers quickly loose interest in pursuing the remaining fish.

Recent Fishery Performance

The NCIMA harvest of northern pike during the 1994 season was 3,884 fish. The Westside Susitna Management Unit accounted for about 66% of this harvest and the Knik Management Unit the remainder (Table 43, Appendices A36-A38). The SWHS has not documented harvests of northern pike from the Eastside Susitna Management Unit or the West Cook Inlet Management Unit, so other than public testimony no information is available regarding northern pike harvest from these areas.

The NCIMA catch of northern pike during 1994 was 8,252 fish with 70% of this catch being reported from the Westside Susitna Management Unit. The number of fish kept increased

Table 43.-Northern Cook Inlet Management Area recreational catch and harvest of northern pike by management unit, 1977-1994.

Year	Northern Cook Inlet Management Area[a]						Region II		Statewide	
	Knik Arm Unit[b]		Westside Susitna Unit		Total		Harvest		Harvest	
	Catch[c]	Harvest	Catch[c]	Harvest	Catch[c]	Harvest	Number	% NCIMA	Number	% NCIMA
1977		0		132		132	321	41.1	11,982	1.1
1978		0		316		316	767	41.2	12,520	2.5
1979		0		382		382	762	50.1	12,741	3.0
1980		0		232		232	1,358	17.1	17,000	1.4
1981		0		125		125	1,411	8.8	16,536	0.7
1982		0		607		607	1,707	35.5	18,964	3.2
1983		0		944		944	2,642	35.7	21,476	4.4
1984		0		1,821		1,821	4,424	41.2	18,641	9.8
1985		156		1,248		1,404	2,240	62.7	17,943	7.8
1986		458		1,519		1,977	2,894	68.3	21,890	9.0
1987		924		1,540		2,464	4,839	50.9	19,079	12.9
1988		364		2,818		3,182	3,598	88.4	23,440	13.6
1989		863		2,257		3,120	4,434	70.4	21,659	14.4
1990	2,593	754	14,465	2,088	17,058	2,842	3,655	77.7	15,985	17.3
1991	7,021	2,709	11,193	3,931	18,214	6,640	8,704	76.3	29,611	22.4
1992	7,097	2,605	13,828	2,777	20,925	5,382	7,314	73.6	18,616	28.9
1993	10,141	2,102	24,077	3,619	34,218	5,717	7,131	80.2	19,366	29.5
1994	2,816	1,328	5,436	2,556	8,252	3,884	5,800	67.0	25,785	15.1
Mean	5,934	681	13,800	1,606	19,733	2,287	3,556	64.3	19,069	12.0
Mean % of NCIMA	30.1	29.8	69.9	70.2	100	100				

[a] No reported catch or harvest from Eastside Susitna or West Cook Inlet management units.

[b] Harvest of northern pike prior to 1985 may have been included in other fish species category.

[c] Catch estimates available beginning in 1990.

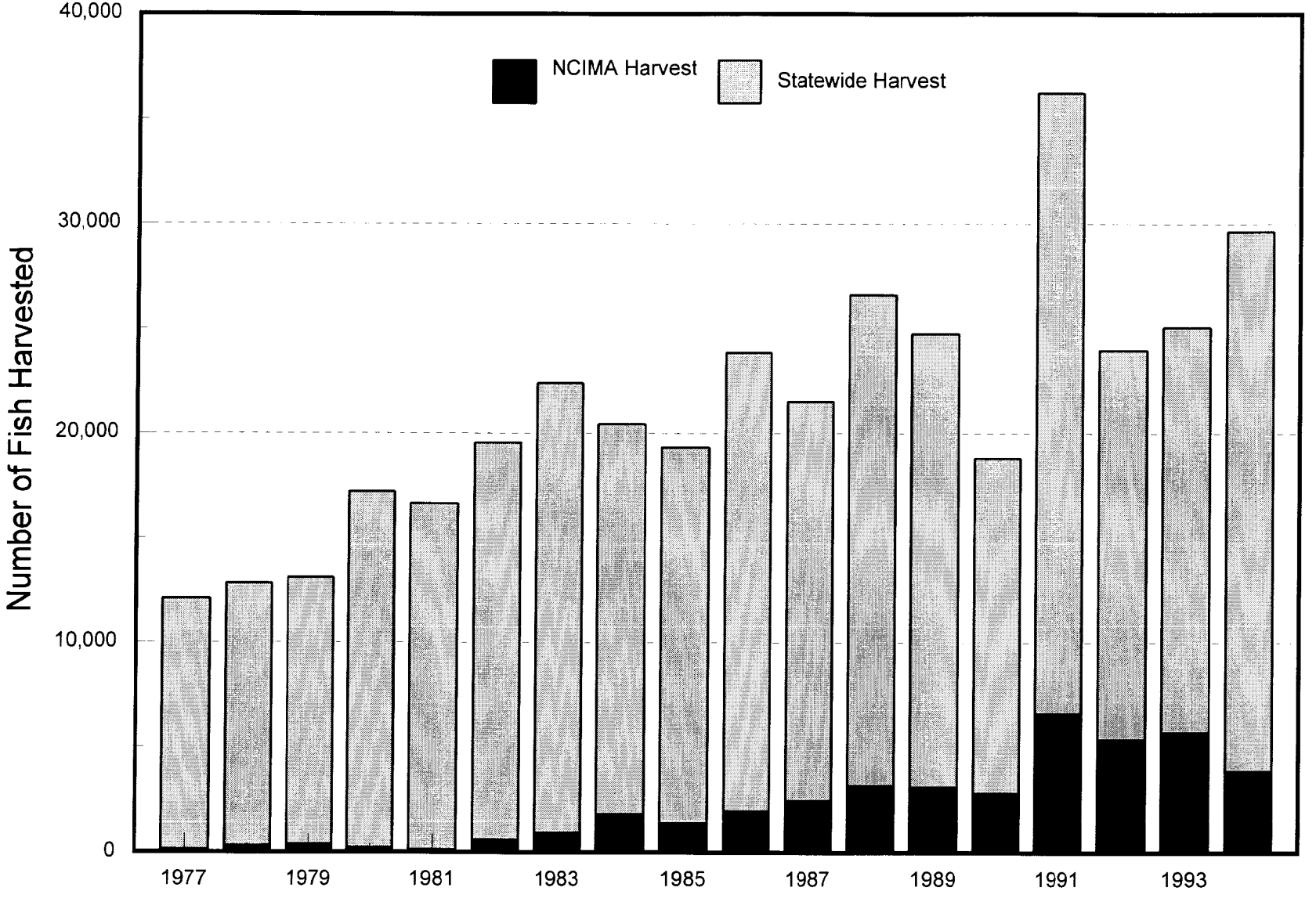


Figure 21.-Estimated northern pike harvest from Northern Cook Inlet Management Area and statewide, 1977-1994.

dramatically from 17% in 1993 to 47% during 1994. While the total catch greatly increased in 1993, the harvest showed only a slight increase (Table 43).

Management Objectives

There are no objectives established governing the management of this fishery. However, the department is supporting various proposals during the upcoming BOF meeting to further liberalize sport fishing gear for northern pike. It is not the intent of the department to manage this fishery on a sustainable yield basis.

Recent Board of Fisheries Actions

During the 1992 BOF meeting a 10 fish bag and possession limit was established for northern pike in the NCIMA. The next BOF meeting that will address issues concerning NCIMA northern pike will occur in February 1996.

Current Issues

Northern pike are well known for their voracious appetites. Several states including Wyoming, Idaho, Maine, and Michigan have addressed northern pike predation on salmonids as a major management concern (D. Rutz, Alaska Department of Fish and Game, Palmer, personal communication). Other state agencies rely on stocking northern pike to control populations of undesirable species. In Alaska there is a growing concern by commercial fishermen, recreational anglers and fishery managers that northern pike predation on chinook, coho and sockeye salmon as well as rainbow trout may put additional pressure on these stocks during a period in which they are subject to increasing harvest. Many people favor overexploitation of northern pike to reduce the impact of northern pike on other fish species indigenous to the area. Studies have shown that in several Susitna basin streams with a large overlap between salmonid and northern pike habitat, salmon stocks (mostly coho salmon) are quickly eliminated by northern pike predation (Rutz *In prep*). In addition, the decimation of rainbow trout, grayling and sockeye salmon stocks within these overlapping habitats has been attributed to northern pike predation. Northern pike prefer soft rayed fish as a food source. This was evident with northern pike sampled in the Hewitt Lake system where sockeye salmon, rainbow trout and coho salmon juveniles were preferred over stickleback (Rutz *In prep*). Once preferred food items have been depleted northern pike quickly adapt to alternative sources (Chapman et al. 1979, Rutz *In prep*) such as insects.

Although there are concerns regarding the impact on salmon and rainbow trout stocks by a growing northern pike population, many recreational anglers welcome a large and healthy pike population for the increased recreational opportunities they represent. Throughout literature there is a history of overexploitation of northern pike due to increasing recreational harvests. Even though the northern pike sport fishery in Upper Cook Inlet is fairly new, the performance of this fishery already indicates overexploitation as evidenced by the lack of large (old) fish available.

Ongoing Research and Management Activities

Age, size, weight and sex samples were collected from a limited number of northern pike during the winter of 1993 and spring of 1994 and 1995. In addition an investigation of juvenile coho salmon in pike infested waters and a northern pike dietary study was conducted during 1995.

Radio transmitters that were implanted in 38 northern pike during 1994 continued to be monitored through the spring of 1995.

A literature search was conducted and a report (Rutz *Unpublished*) written documenting the findings of the 1994 and 1995 studies. This report was submitted to the Federal Aid Section of the United States Fish and Wildlife Service (USF&WS).

Recommended Research and Management Activities

It is recommended that the northern pike research program continue for at least 2 additional years. During 1996 it will focus on lakes of the Susitna River drainage that support major fisheries for this species. The objectives of the study will be: (1) to estimate the age, sex, length and weight composition, mean length and mean length-at-age of northern pike in Alexander Lake; (2) to estimate the distribution of northern pike in the Susitna River drainage; (3) to estimate the abundance of northern pike (>449 mm) in Alexander Lake; and (4) identify the proportion of major food items of northern pike captured in several Susitna basin systems. It is also recommended that a new component be added to the existing study to determine the effects of predation on coho, sockeye and chinook salmon juveniles by slough dwelling northern pike in the Susitna drainage system. These side sloughs and channels provide important rearing habitat for salmon smolt on their seaward migration and for juvenile salmon from adjacent systems that do not contain adequate rearing habitat. These sloughs and side channels are areas where juvenile salmon from all Susitna drainage systems will, for a time, become vulnerable to northern pike predation.

ACKNOWLEDGMENTS

Much of the content of this report was taken from Larry Engel and Doug Vincent-Lang's 1992 NCIMA report to the Board of Fisheries. Craig Baer and Dave Rutz made significant contributions to the stocked lakes, rainbow trout and northern pike sections. Larry Erie contributed to the access section. Margaret Leonard contributed to the editing and finalizing of the document.

LITERATURE CITED

ADF&G (Alaska Department of Fish and Game). 1986. Cook Inlet and Copper River rainbow/steelhead trout management policy. Division of Sport Fish, Anchorage.

ADF&G (Alaska Department of Fish and Game). *Unpublished.* Stocking operational plans for the southcentral region. 1992. Division of Sport Fish, Anchorage.

ADNR (Alaska Department of Natural Resources). 1991. Susitna basin recreation rivers management plan. Division of Land, Land and Resources Section, Anchorage.

Bartlett, L. 1992. Creel, escapement, and stock statistics for coho salmon on the Little Susitna River, Alaska, during 1991. Alaska Department of Fish and Game, Fishery Data Series No. 92-24, Anchorage.

Bartlett, L. 1993. Creel, escapement, and stock statistics for coho salmon on the Little Susitna River, Alaska, during 1992. Alaska Department of Fish and Game, Fishery Data Series No. 93-32, Anchorage.

Bartlett, L. 1994. Creel, escapement, and stock statistics for coho salmon on the Little Susitna River, Alaska, during 1993. Alaska Department of Fish and Game, Fishery Data Series No. 94-29, Anchorage.

Bartlett, L. *In prep.* Creel, escapement, and stock statistics for coho salmon on the Little Susitna River, Alaska, during 1994. Alaska Department of Fish and Game, Fishery Data Series report, Anchorage.

LITERATURE CITED (Continued)

Bartlett, L. and A. Bingham. 1991. Creel and escapement statistics for coho salmon on the Little Susitna River, Alaska, during 1990. Alaska Department of Fish and Game, Fishery Data Series No. 91-46, Anchorage.

Bartlett, L. and R. H. Conrad. 1988. Effort and catch statistics for the sport fishery for coho salmon in the Little Susitna River with estimates of escapement, 1987. Alaska Department of Fish and Game, Fishery Data Series No. 51, Juneau.

Bartlett, L. and S. Sonnichsen. 1990. Creel and escapement statistics for coho salmon and chinook salmon on the Little Susitna River, Alaska, during 1989. Alaska Department of Fish and Game, Fishery Data Series No. 90-59, Anchorage.

Bartlett, L. and D. Vincent-Lang. 1989. Creel and escapement statistics for coho and chinook salmon stocks of the Little Susitna River, Alaska, during 1988. Alaska Department of Fish and Game, Fishery Data Series No. 86, Juneau.

Bentz, R. W. 1982. Inventory and cataloging of the sport fish and sport fish waters in upper Cook Inlet. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1981-1982, Project F-9-14, 23 (G-I-D):76-112, Juneau.

Bentz, R. W. 1983. Inventory and cataloging of sport fish and sport fish waters in upper Cook Inlet. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1982-1983, Project F-9-15, 24 (G-I-D):59-104, Juneau.

Bradley, T. J. 1990. Cook Inlet rainbow trout studies, 1989. Alaska Department of Fish and Game, Fishery Data Series No. 90-60, Anchorage.

Bradley, T. J. 1991. Cook Inlet rainbow trout studies, 1990. Alaska Department of Fish and Game, Fishery Data Series No. 91-54, Anchorage.

Chapman, L. J., W. C. Mackay, and C. W. Wilkison. 1979. Feeding flexibility in northern pike (Esox lucius): fish verses invertebrate prey. Can. J. Fish. Aquat. Sci. 46:666-669.

Chlupach, R. S. and G. B. Kyle. 1990. Enhancement of Big Lake sockeye salmon (Oncorhynchus nerka): summary of fisheries production (1976-1989). Alaska Department of Fish and Game, Division of Fisheries Rehabilitation, Enhancement and Development Report No. 106, Juneau.

CIAA (Cook Inlet Aquaculture Association). 1995. Eklutna salmon hatchery annual management plan, CY 1995.

Delaney, K. and D. Vincent-Lang. 1992. Current status and recommendations for the future management of the chinook salmon stocks of Northern Cook Inlet. A report to the Alaska Board of Fisheries, Anchorage, Alaska, November 1992. Alaska Department of Fish and Game, Division of Sport Fish, Anchorage.

Engel, L. and D. Vincent-Lang. 1992. Area management report for the recreational fisheries of Northern Cook Inlet. Report to the Alaska Board of Fisheries, November 1992. Alaska Department of Fish and Game, Division of Sport Fish, Anchorage.

Fox, J. and P. H. Ruesch. 1992. Upper Cook Inlet subsistence and personal use fisheries, report to Alaska Board of Fisheries, 1992. Alaska Department of Fish and Game, Division of Commercial Fisheries. Regional Information Report No. 2A92-20. Anchorage.

Hepler, K. R. and R. W. Bentz. 1984. Chinook salmon population and angler use studies of upper Cook Inlet waters. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1983-1984, Project F-9-16, 25 (G-II-M):40-58, Juneau.

Hepler, K. R. and R. W. Bentz. 1985. Chinook salmon population and angler use studies of Northern Cook Inlet waters. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1984-1985, Project F-9-17, 26 (G-II-M):150-172, Juneau.

LITERATURE CITED (Continued)

Hepler, K. R. and R. W. Bentz. 1986. Cook Inlet chinook salmon studies. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1985-1986, Project F-10-1, 27 (S-32-7 and 8):174-195, Juneau.

Hepler, K. R. and R. W. Bentz. 1987. Harvest, effort, and escapement statistics for selected chinook salmon (Oncorhynchus tshawytscha) sport fisheries in Northern Cook Inlet, Alaska, 1986. Alaska Department of Fish and Game, Fishery Data Series No. 8, Juneau.

Hepler, K. R., R. Conrad, and D. Vincent-Lang. 1988. Estimates of effort and harvest for selected sport fisheries for chinook salmon in Northern Cook Inlet, Alaska, 1987. Alaska Department of Fish and Game, Fishery Data Series No. 59, Juneau.

Hepler, K. R., A. G. Hoffmann, and D. Vincent-Lang. 1989. Estimates of effort and harvest of selected sport fisheries for chinook salmon in Northern Cook Inlet, Alaska, 1988. Alaska Department of Fish and Game, Fishery Data Series No. 85, Juneau.

Howe, Allen L., Gary Fidler, and Michael J. Mills. 1995. Harvest, catch, and participation in Alaska sport fisheries during 1994. Alaska Department of Fish and Game, Fishery Data Series No. 95-24, Anchorage.

Jones & Stokes Associates, Inc. 1987. Southcentral Alaska sport fishing economic study. Final research report. November 1987. (JSA86-0413.) Sacramento, CA. Prepared for Alaska Department of Fish and Game, Sport Fish Division, Research and Technical Services Section, Anchorage, AK.

Mills, M. J. 1979. Alaska statewide sport fish harvest studies. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1978-1979, Project F-9-11, 20 (SW-I-A), Juneau.

Mills, M. J. 1980. Alaska statewide sport fish harvest studies. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1979-1980, Project F-9-12, 21 (SW-I-A), Juneau.

Mills, M. J. 1981a. Alaska statewide sport fish harvest studies 1979 data. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1980-1981, Project F-9-13, 22 (SW-I-A), Juneau.

Mills, M. J. 1981b. Alaska statewide sport fish harvest studies 1980 data. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1980-1981, Project F-9-13, 22 (SW-I-A), Juneau.

Mills, M. J. 1982. Alaska statewide sport fish harvest studies 1981 data. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1981-1982, Project F-9-14, 23 (SW-I-A), Juneau.

Mills, M. J. 1983. Alaska statewide sport fish harvest studies 1982 data. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1982-1983, Project F-9-15, 24 (SW-I-A), Juneau.

Mills, M. J. 1984. Alaska statewide sport fish harvest studies 1983 data. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1983-1984, Project F-9-16, 25 (SW-I-A), Juneau.

Mills, M. J. 1985. Alaska statewide sport fish harvest studies 1984 data. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1984-1985, Project F-9-17, 26 (SW-I-A), Juneau.

Mills, M. J. 1986. Alaska statewide sport fish harvest studies 1985 data. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1985-1986, Project F-10-1, 27 (RT-2), Juneau.

Mills, M. J. 1987. Alaska statewide sport fisheries harvest report 1986. Alaska Department of Fish and Game, Fishery Data Series No. 2, Juneau.

Mills, M. J. 1988. Alaska statewide sport fisheries harvest report 1987. Alaska Department of Fish and Game, Fishery Data Series No. 52, Juneau.

Mills, M. J. 1989. Alaska statewide sport fisheries harvest report 1988. Alaska Department of Fish and Game, Fishery Data Series No. 122, Juneau.

LITERATURE CITED (Continued)

Mills, M. J. 1990. Harvest and participation in Alaska sport fisheries during 1989. Alaska Department of Fish and Game, Fishery Data Series No. 90-44, Anchorage.

Mills, M. J. 1991. Harvest, catch, and participation in Alaska sport fisheries during 1990. Alaska Department of Fish and Game, Fishery Data Series No. 92-40, Anchorage.

Mills, M. J. 1992. Harvest, catch, and participation in Alaska sport fisheries during 1991. Alaska Department of Fish and Game, Fishery Data Series No. 91-58, Anchorage.

Mills, M. J. 1993. Harvest, catch, and participation in Alaska sport fisheries during 1992. Alaska Department of Fish and Game, Fishery Data Series No. 93-42, Anchorage.

Mills, M. J. 1994. Harvest, catch, and participation in Alaska sport fisheries during 1993. Alaska Department of Fish and Game, Fishery Data Series No. 94-28, Anchorage.

Peltz, L. and D. E. Sweet. 1992. Performance of the chinook salmon enhancement program in Willow Creek, Alaska, 1985-1991. Alaska Department of Fish and Game, Fishery Data Series No. 92-33, Anchorage.

Peltz, L. and D. E. Sweet. 1993. Performance of the chinook salmon enhancement program in Willow Creek, Alaska, 1985-1992. Alaska Department of Fish and Game, Fishery Data Series No. 93-22, Anchorage.

Ruesch, P. H. and J. Fox. 1995. Upper Cook Inlet commercial fisheries annual management report, 1994. Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division, Regional Information Report No. 2A95-26, Anchorage.

Ruesch, P. H. and J. Fox. *In prep.* Upper Cook Inlet commercial fisheries annual management report, 1995. Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division, Regional Information Report, Anchorage.

Rutz, D. S. 1992. Age and size statistics for rainbow trout collected in the Susitna River drainage during 1991. Alaska Department of Fish and Game, Fishery Data Series No. 92-26, Anchorage.

Rutz, D. S. 1993. Age and size statistics for rainbow trout collected in the Susitna River drainage during 1992. Alaska Department of Fish and Game, Fishery Data Series No. 93-55, Anchorage.

Rutz, D. S. *Unpublished.* Age and size statistics, movement and distribution of northern pike collected in the Susitna drainage, 1994. Alaska Department of Fish and Game, Palmer.

Stratton, B. L., P. A. Cyr, and J. J. Hasbrouck. 1996. Estimates of commercial harvest and escapement of coho salmon stocked into Northern Cook Inlet streams, 1994. Alaska Department of Fish and Game, Fishery Data Series No. 96-4, Anchorage.

Sweet, D. E., A. E. Bingham, and K. A. Webster. 1991. Estimates of effort and harvest for selected sport fisheries for chinook salmon in Northern Cook Inlet, Alaska, 1990. Alaska Department of Fish and Game, Fishery Data Series No. 91-6, Anchorage.

Sweet, D. E. and L. Peltz. 1994. Performance of the chinook salmon enhancement program in Willow Creek, Alaska, 1985-1993. Alaska Department of Fish and Game, Fishery Manuscript No. 94-3, Anchorage.

Sweet, D. E. and K. A. Webster. 1990. Estimates of effort and harvest for selected sport fisheries for chinook salmon in Northern Cook Inlet, Alaska, 1989. Alaska Department of Fish and Game, Fishery Data Series No. 90-32, Anchorage.

Vincent-Lang, D., M. Alexandersdottir, D. McBride. 1993. Mortality of coho salmon caught and released using sport tackle in the Little Susitna River, Alaska. Fisheries Research 15 (1993):339-356. Elsevier Science Publishers B.V., Amsterdam.

LITERATURE CITED (Continued)

Vincent-Lang, D. and K. R. Hepler. 1989. Estimates of sport effort and catch and harvest of rainbow trout and coho salmon in Lake Creek, Alaska during 1988. Alaska Department of Fish and Game, Fishery Data Series No. 81, Juneau.

Watsjold, D. A. 1978. Inventory, cataloging and population sampling of the sport fish and sport fish waters in upper Cook Inlet. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1977-1978, Project F-9-10, 19 (G-I-D):57-88, Juneau.

Watsjold, D. A. 1980. Inventory and cataloging of the sport fish and sport fish waters in upper Cook Inlet. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1979-1980, Project F-9-12, 21 (G-I-D):91-120, Juneau.

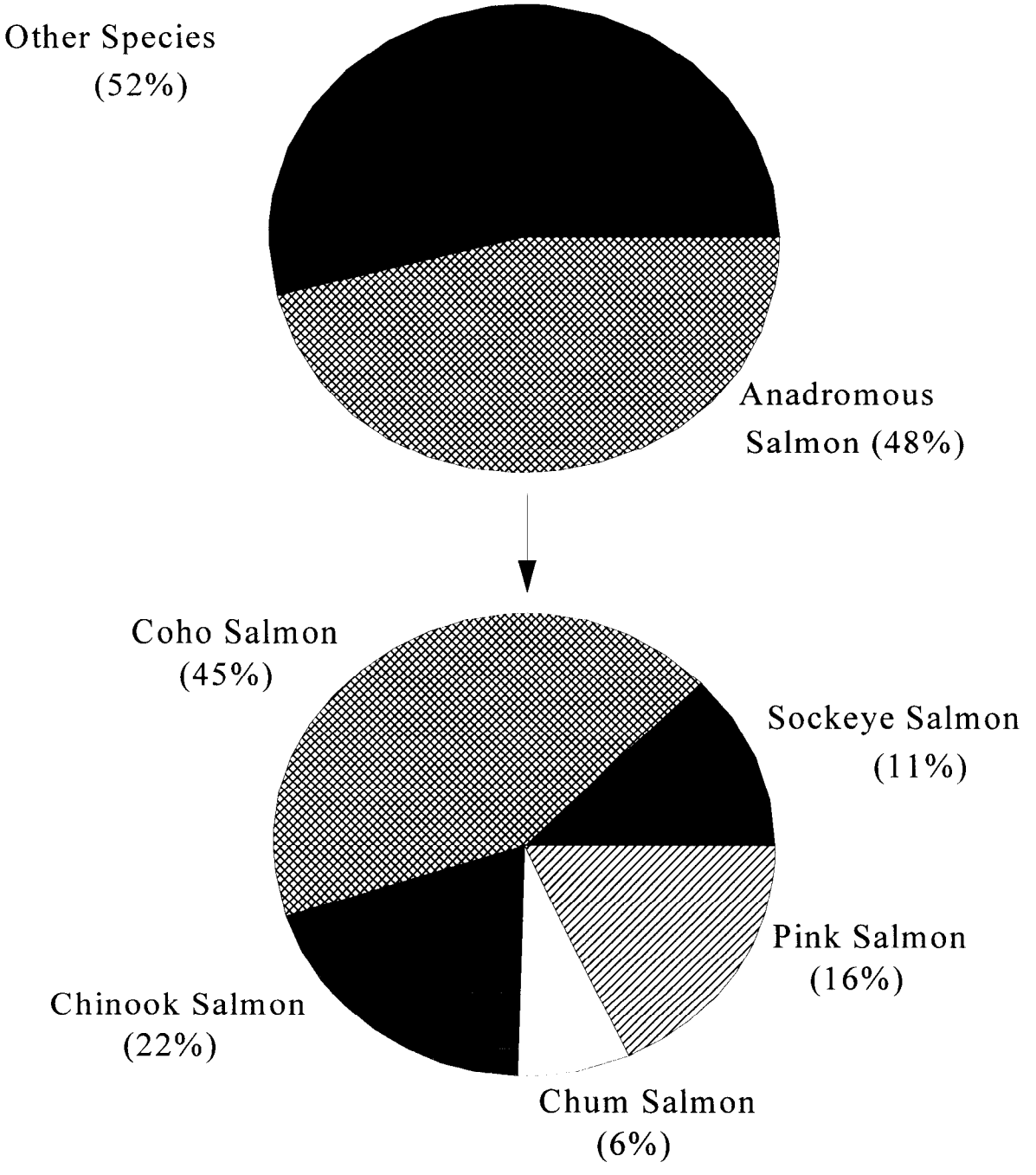
Watsjold, D. A. 1981. Inventory and cataloging of the sport fish and sport fish waters in upper Cook Inlet. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Performance Report, 1980-1981, Project F-9-13, 22 (G-I-D):62-85, Juneau.

Whitmore, C., D. Sweet and L. Bartlett. 1993. Area management report for the recreational fisheries of Northern Cook Inlet. Alaska Department of Fish and Game, Division of Sport Fish, Anchorage.

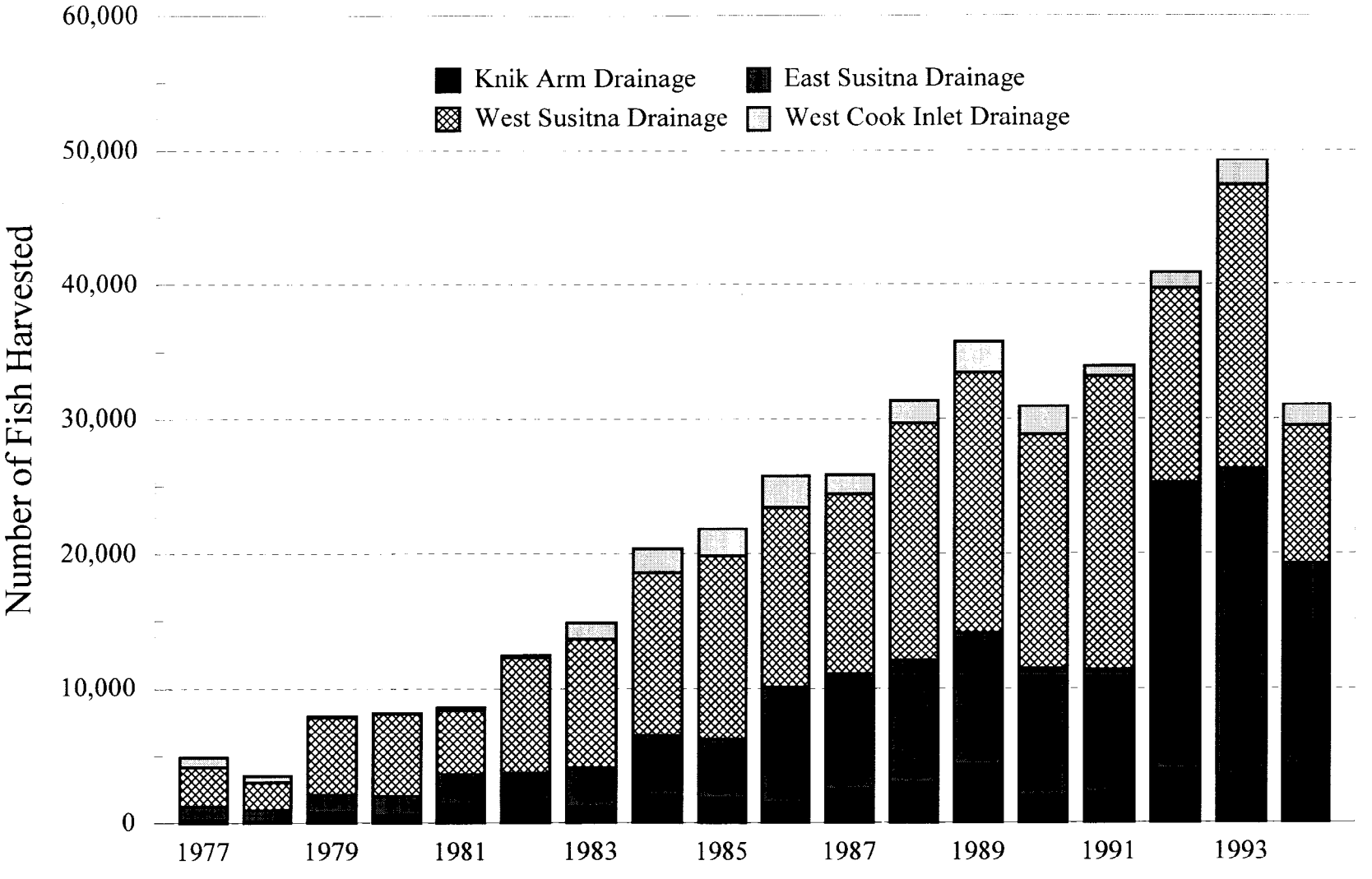
Whitmore, C., D. Sweet, L. Bartlett, A. Havens, and L. Restad. 1994. 1993 Area management report for the recreational fisheries of Northern Cook Inlet. Alaska Department of Fish and Game, Fishery Management Report No. 94-6, Anchorage.

Whitmore, C., D. Sweet and L. Bartlett. 1995. Area management report for the recreational fisheries of Northern Cook Inlet, 1994. Alaska Department of Fish and Game, Fishery Management Report No. 95-6, Anchorage.

APPENDIX A



Appendix A1.-Northern Cook Inlet Management Area sport fish harvest anadromous salmon composition, 1977-1994.



Appendix A2.-Northern Cook Inlet Management Area recreational chinook salmon harvest, 1977-1994.

Appendix A3.-Knik Arm drainage chinook salmon harvest by fishery, 1977-1994.

Year	Fish Ck. Marine	Other Marine	Little Susitna	Knik River[a]	Eklutna Tailrace	Wasilla Creek	Cottonwood Creek	Big Lake[b]	Other[c]	Total
1977			191			0			16	207
1978			93			47			0	140
1979			800			0	0		0	800
1980			646			0	0		0	646
1981			1,418	0		0	0		48	1,466
1982			1,467	0		0	0		199	1,666
1983	16	47	1,187	5		0	0		0	1,255
1984	125	24	1,883	0	0	0	0		25	2,057
1985			1,845	0	0	0	0	44	0	1,889
1986		50	1,457	0	0	0	0	0	17	1,524
1987	117	58	2,282	0	0	0	0	19	0	2,476
1988	0	0	2,822	0	0	66	0	0	28	2,916
1989	77	44	4,204	0	0	16	0	0	0	4,341
1990	28	23	1,965	0	0	6	0	0	0	2,022
1991	129	23	2,102	0	0	17	0	6	0	2,277
1992	16	8	3,920	0	0	9	0	0	16	3,969
1993	104	48	3,441	0	0	9	0	0	0	3,602
1994	0	20	4,204	0	0	0	0	0	79	4,303
Mean	61	31	1,996	0	0	9	0	7	24	2,086

[a] Knik River and tributaries including Jim Creek.

[b] Big Lake drainage streams.

[c] Includes lakes and streams.

Appendix A4.-Eastside Susitna River drainage chinook salmon harvest by fishery, 1977-1994.

Year	Willow Creek	Lt.Willow Creek	Kashwitna River	Caswell Creek	Sheep Creek	Goose Creek	Montana Creek	Birch Creek	Sunshine Creek	Talkeetna[a] River	Other[b]	Total
1977	137	16			259		415			25	204	1,056
1978	47	0			256		408			12	163	886
1979	459	0		156	10		312		10	312	39	1,298
1980	289	32		215	45		559		13	172	45	1,370
1981	585	0		249	0		661		57	373	277	2,202
1982	629	0		471	0		241		52	450	220	2,063
1983	534	0	231	272	0		504		105	934	272	2,852
1984	774	37	0	586	0	0	1,522		125	1,272	112	4,428
1985	1,063	25		527	0		979		771	871	106	4,342
1986	1,017	872	73	327	1,778	145	2,796	290	327	908	36	8,569
1987	1,987	711	116	88	1,610	334	1,726	44	319	1,639	29	8,603
1988	2,349	937	0	578	1,847	218	1,070	28	303	1,762	47	9,139
1989	2,846	507	11	357	1,116	385	1,708	28	368	2,372	85	9,783
1990	3,237	387	6	330	1,537	504	478		465	2,358	121	9,423
1991	3,208	684	41	305	1,519	288	575	47	230	2,025	161	9,083
1992	8,884	1,023	16	592	2,663	1,033	3,078	101	365	3,338	214	21,307
1993	8,626	1,200	38	531	2,300	633	4,054	9	280	4,729	288	22,688
1994	5,980	745	78	562	1,349	361	3,111	108	297	2,144	235	14,970
Mean	2,370	399	55	384	905	390	1,344	82	255	1,428	147	7,448

[a] Talkeetna River and tributaries including Clear Creek.

[b] Includes lakes and streams.

Appendix A5.-Westside Susitna River drainage chinook salmon harvest by fishery, 1977-1994.

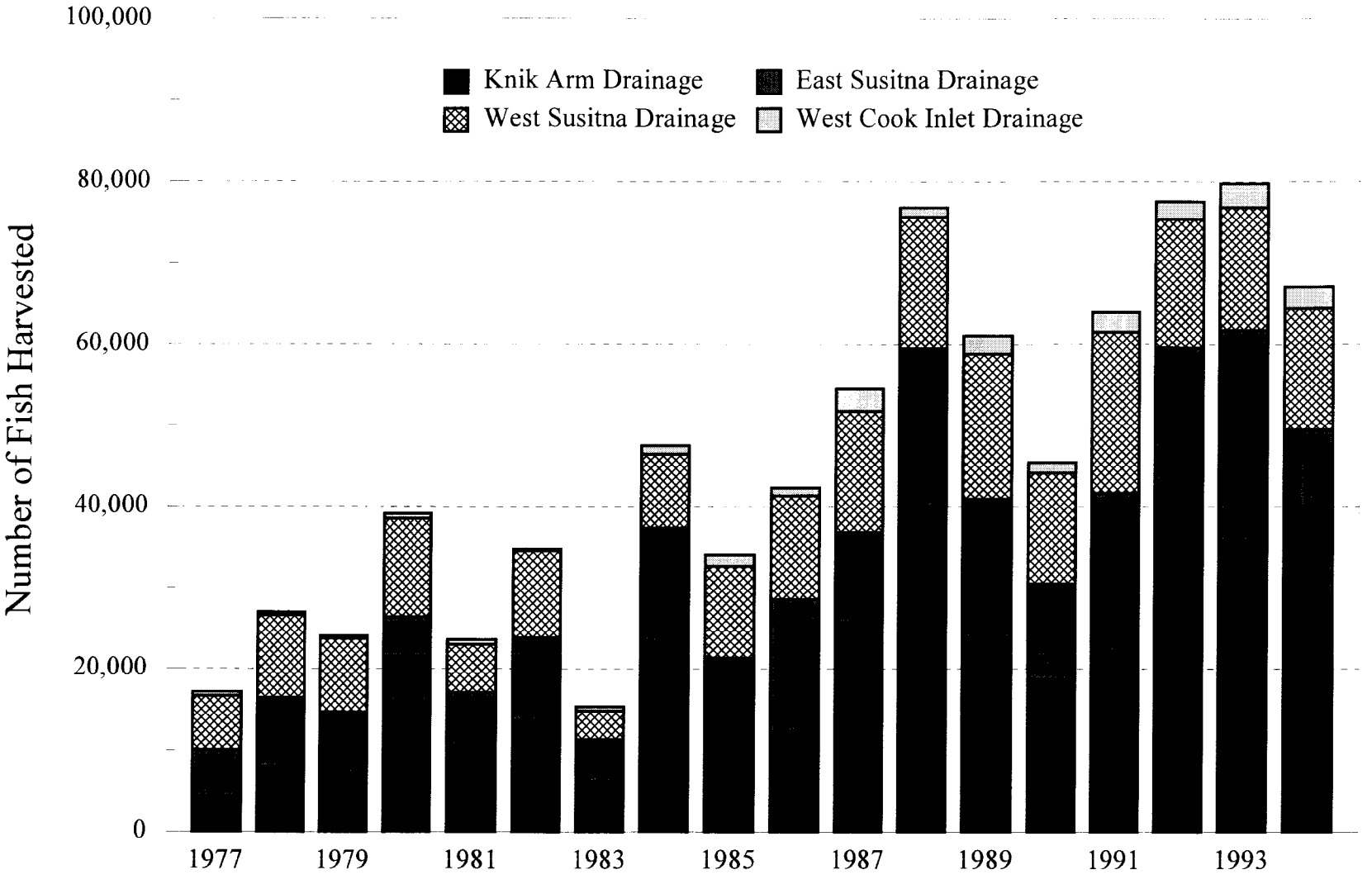
Year	Alexander Creek	Deshka River	Rabideux Creek	Moose Creek	Yentna River	Peters Creek	Lake Creek	Fish Creek[a]	Talachulitna River	Other Streams[b]	Other Lakes[b]	Total
1977	820	1,017					464		224	413	0	2,938
1978	769	850					326		12	82	0	2,039
1979	712	2,811					1,796		293	156	0	5,768
1980	1,438	3,685					775		121	129	0	6,148
1981	1,121	2,769					795		57	0	0	4,742
1982	2,506	4,307					1,645		0	115	0	8,573
1983	1,711	4,889					2,423		336	209	0	9,568
1984	2,107	5,699				112	2,881		424	709	174	12,106
1985	2,761	6,407					2,575		224	1,677	0	13,644
1986	2,937	6,490		44			2,134	647	201	904	45	13,402
1987	2,224	5,632					3,282	834	116	1,252	10	13,350
1988	4,687	5,474				549	2,784	729	909	829	9	15,970
1989	4,882	8,062	12	81	215	339	3,554	1,202	403	575	18	19,343
1990	5,119	6,161	55		178	385	3,423	740	709	631	24	17,425
1991	6,548	9,306			301	495	2,712	660	848	942	24	21,836
1992	4,124	7,256	23		652	655	3,668	879	445	867	168	18,737
1993	5,154	5,682			653	283	6,425	1,148	875	922	0	21,142
1994	3,070	624			402	202	3,548	930	927	545	0	10,248
Mean	2,927	4,840	30	63	400	378	2,512	863	396	609	26	12,054

[a] Fish Lake drainage (Yentna River drainage).

[b] May include harvest from West Cook Inlet waters.

Appendix A6.-West Cook Inlet drainage chinook salmon harvest by fishery, 1977-1994.

Year	Chuitna River	Beluga River	Theodore River	Lewis River	Other Sites	Total
1977	227		237	9		473
1978	408		58	12		478
1979	78		20	0		98
1980	17		17	0		34
1981	115		77			192
1982	105		42			147
1983	1,185		0			1,185
1984	723		1,110			1,833
1985	734		1,195	100		2,029
1986	960		1,418			2,378
1987	146		1,146	185		1,477
1988	312		1,137	246		1,695
1989	581	237	1,317	190		2,325
1990	1,064		748	285		2,097
1991	377		369	16		762
1992	516	175	522			1,213
1993	893		527	27	408	1,855
1994	530		581		466	1,577
Mean	498	206	585	97	437	1,214



Appendix A7.-Northern Cook Inlet Management Area recreational coho salmon harvest, 1977-1994.

Appendix A8.-Knik Arm drainage coho salmon harvest by fishery, 1977-1994.

Year	Fish Ck. Marine	Other Marine	Little Susitna	Knik River[a]	Eklutna Tailrace	Wasilla Creek	Cottonwood Creek	Big Lake[b]	Other[c]	Total
1977			3,415			472			479	4,366
1978			4,865			2,112			918	7,895
1979			3,382			1,211	1,198		1,348	7,139
1980			6,302			3,555	3,375		2,798	16,030
1981			5,940	1,801		814	1,373		556	10,484
1982			7,116	2,306		1,624	1,886		744	13,676
1983	983	513	2,835	774		345	518		171	6,139
1984	1,060	12	14,253	3,429	561	1,920	1,895		299	23,429
1985		120	7,764	2,523	557	1,900	1,005	284	186	14,339
1986		106	6,039	2,948	502	944	690	364	768	12,361
1987	181	453	13,003	3,676	2,318	1,195	1,159	833	2,969	25,787
1988	200	73	19,009	11,078	3,329	1,273	746	1,637	2,692	40,037
1989	142	204	14,129	4,220	1,666	975	876	784	850	23,846
1990	251	35	7,497	6,184	1,012	1,012	286	398	2,087	18,762
1991	255	182	16,450	2,920	631	844	176	486	242	22,186
1992	130	0	20,033	3,409	664	413	348	526	291	25,814
1993	181	984	27,610	2,878	1,337	1,133	736	741	163	35,763
1994	100	99	17,665	3,946	3,553	1,390	1,100	492	194	28,539
Mean	348	232	10,962	3,721	1,466	1,285	1,085	655	1,001	18,715

[a] Knik River and tributaries including Jim Creek.

[b] Big Lake drainage streams.

[c] Includes lakes and streams.

Appendix A9.-Eastside Susitna River drainage coho salmon harvest by fishery, 1977-1994.

Year	Willow Creek	Lt. Willow Creek	Kashwitna River	Caswell Creek	Sheep Creek	Goose Creek	Montana Creek	Birch Creek	Sunshine Creek	Talkeetna[a] River	Other[b]	Total
1977	679	225			438		1,415			1,070	1,882	5,709
1978	905	151			478		2,451			2,200	2,388	8,573
1979	462	262		624	462		1,735		774	1,248	1,997	7,564
1980	1,207	494		1,124	430		2,684		1,634	661	2,234	10,468
1981	747	29		901	326		2,261		968	422	939	6,593
1982	1,069	398		776	367		3,060		1,719	996	1,782	10,167
1983	576	52	52	408	596		1,402		722	836	532	5,176
1984	1,846	1,147	162	1,247	661	449	4,502		1,733	1,509	660	13,916
1985	1,026	528		608	478		1,972		1,205	747	478	7,042
1986	944	363	871	472	1,343	363	1,488	980	4,029	3,376	1,961	16,190
1987	2,898	561	36	453	1,068	145	1,394	163	1,612	2,608	90	11,028
1988	4,875	1,237	327	1,455	3,165	291	2,219	691	2,146	2,929	183	19,518
1989	4,218	1,388	336	834	2,231	190	2,295	281	2,159	2,775	371	17,078
1990	2,711	639	197	2,596	991	180	778		704	2,539	408	11,743
1991	4,154	1,308	167	3,819	1,544	657	1,612	322	1,761	3,435	700	19,479
1992	8,591	1,830	713	5,393	4,049	502	3,595	858	2,259	5,531	469	33,790
1993	5,743	1,213	554	2,385	2,413	428	3,496	535	2,922	5,830	544	26,063
1994	4,504	1,452	328	1,569	1,586	478	2,619	281	1,906	5,476	671	20,870
Mean	2,620	738	340	1,542	1,257	368	2,277	514	1,766	2,455	1,016	13,943

[a] Talkeetna River and tributaries including Clear Creek.

[b] Includes lakes and streams.

Appendix A10.-Westside Susitna River drainage coho salmon harvest by fishery, 1977-1994.

Year	Alexander Creek	Deshka River	Rabideux Creek	Peters Creek	Yentna River	Lake Creek	Fish Creek[a]	Talachulitna River	Other[b]	Total
1977	1,562	559				1,203		346	2,929	6,599
1978	2,401	1,789				2,212		88	3,683	10,173
1979	1,560	973				2,671		125	3,707	9,036
1980	999	2,290				2,351		491	6,010	12,141
1981	891	632				1,035		240	3,391	6,189
1982	1,907	2,463				1,603		524	4,571	11,068
1983	408	1,036				1,392		84	838	3,758
1984	1,509	1,646		12		2,432		486	3,052	9,137
1985	1,455	2,637				4,105		224	2,849	11,270
1986	1,352	4,290				1,575	324	402	4,895	12,804
1987	1,539	2,789				1,358	362	235	2,264	8,547
1988	1,965	7,458		18		2,110	400	418	3,841	16,210
1989	2,207	9,151	409	47	103	1,907	549	688	3,155	18,216
1990	1,973	4,959	540	33	353	2,986	793	276	1,838	13,751
1991	2,296	8,111	32	221	718	4,221	1,081	828	2,393	19,901
1992	834	7,110	543	300	275	2,632	575	405	3,155	15,829
1993	1,719	6,530		67	227	3,101	920	152	2,356	15,072
1994	2,188	5,511		72	556	2,723	714	427	2,871	15,062
Mean	1,598	3,885	381	96	372	2,312	635	358	3,209	11,931

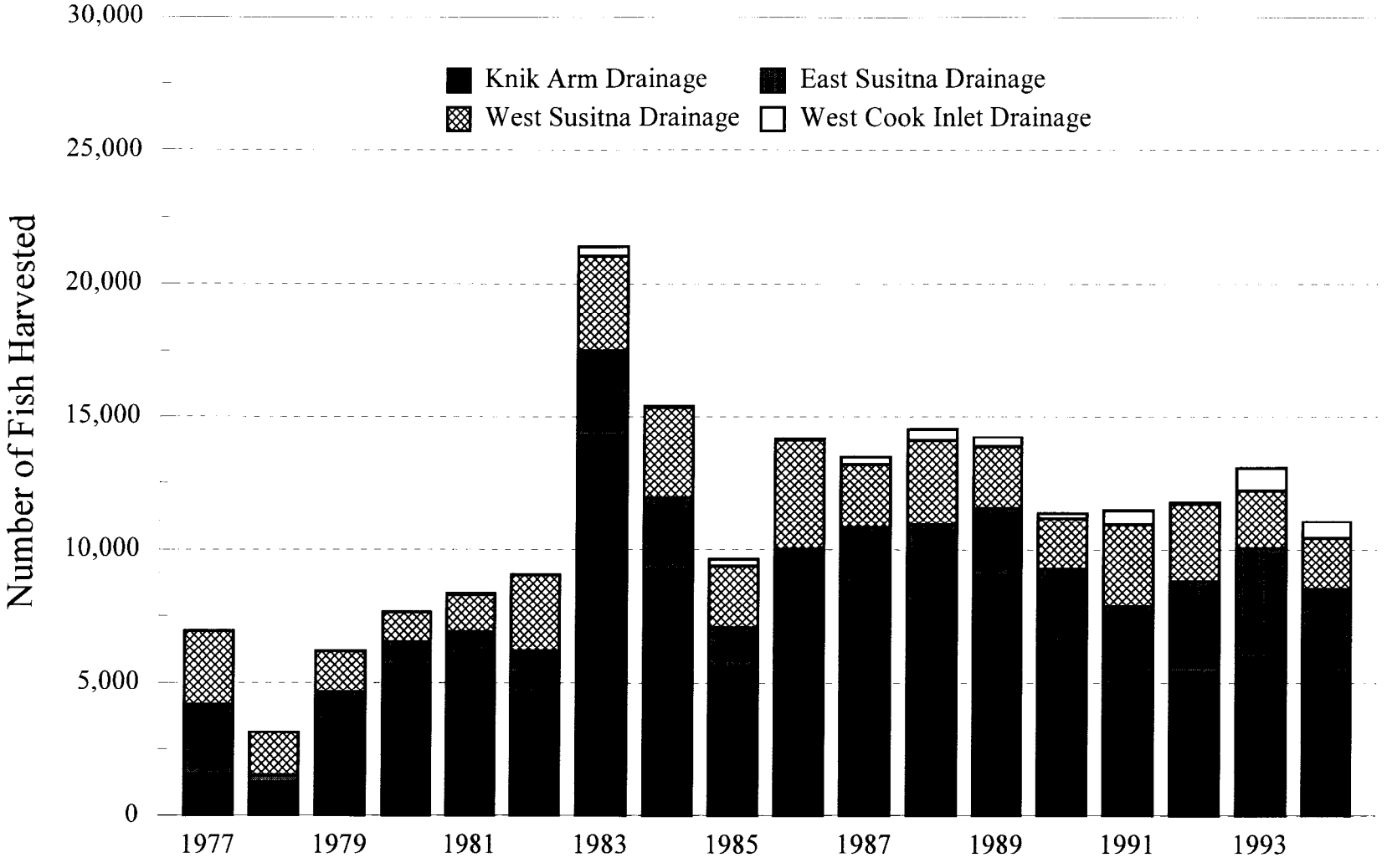
[a] Fish Lake drainage (Yentna River drainage).

[b] May include harvest from West Cook Inlet Management Unit lakes and streams.

Appendix A11.-West Cook Inlet drainage coho salmon harvest by fishery, 1977-1994.

Year	Chuitna River	Beluga River	Theodore River	Lewis River	Other[a]	Total
1977	316		113	103		532
1978	277		101	0		378
1979	287		50	0		337
1980	258		370	0		628
1981	594		10			604
1982	220		115			335
1983	554		10			564
1984	898		137			1,035
1985	1,095		261	75		1,431
1986	815		168			983
1987	1,684		996	145		2,825
1988	782		400	0		1,182
1989	1,228	419	502	112	9	2,270
1990	1,113		198	33		1,344
1991	1,791		513	181		2,485
1992	1,547	243	421			2,211
1993	1,313		236	194	1,217	2,960
1994	559		521		1,615	2,695
Mean	852	331	285	77	947	1,378

[a] Includes lakes and streams.



Appendix A12.-Northern Cook Inlet Management Area recreational sockeye salmon harvest, 1977-1994.

Appendix A13.-Knik Arm drainage sockeye salmon harvest by fishery, 1977-1994.

Year	Fish Ck. Marine	Other Marine	Little Susitna	Knik River[a]	Eklutna Tailrace	Wasilla Creek	Cottonwood Creek	Big Lake[b]	Big Lake	Nancy Lake[c]	Other[d]	Total
1977			888			274			37	56	321	1,576
1978			859			0			0	14	366	1,239
1979			1,478			0	1,525		157	0	456	3,616
1980			2,127			0	2,660		43	69	775	5,674
1981			1,619	450		0	3,245		134	316	316	6,080
1982			1,865	880		0	608		126	618	524	4,621
1983	6,013	1,748	2,787	1,277		0	1,632		89	587	164	14,297
1984	499	237	6,385	823	187	200	661		175	12	61	9,240
1985		76	2,894	1,037	142	120	1,179	109	22	33	0	5,612
1986		50	3,616	905	28	61	789	39	0	99	422	6,009
1987	417	435	3,513	1,105	254	18	869	1,087	0	670	417	8,785
1988	437	36	2,310	1,928	200	36	346	2,037	0	109	637	8,076
1989	789	364	2,315	1,322	204	98	683	2,900	0	169	196	9,040
1990	174	87	891	2,219	29	19	271	2,238	0	107	553	6,588
1991	395	320	1,722	1,459	19	56	47	565	0	207	178	4,968
1992	8	148	1,274	1,471	173	8	633	1,241	0	263	130	5,349
1993	588	106	2,487	1,041	211	134	453	598	0	0	308	5,926
1994	123	6	1,809	1,258	133	76	807	476	0	66	328	5,082
Mean	944	301	2,269	1,227	144	61	1,026	1,129	44	189	342	6,210

[a] Knik River and tributaries including Jim Creek.

[b] Big Lake drainage streams.

[c] Nancy Lake complex lakes.

[d] Includes lakes and streams.

Appendix A14.-Eastside Susitna River drainage sockeye salmon harvest by fishery, 1977-1994.

Year	Willow Creek	Little Willow	Kashwitna River	Caswell Creek	Sheep Creek	Goose Creek	Montana Creek	Birch Creek	Sunshine Creek	Talkeetna River[a]	Other Streams[b]	Other Lakes	Total
1977	831	305			450		978			334	696		3,594
1978	56	28			14		85			28	56		267
1979	94	141		0	31		346		157	31	220		1,020
1980	83	77		77	0		257		116	6	257		873
1981	77	67		38	105		182		220	29	115		833
1982	94	105		52	88		514		189	115	398		1,555
1983	425	110	0	151	370		534		685	534	343	69	3,221
1984	249	337	0	87	62	0	561		100	636	636	37	2,705
1985	139	80		110	30		279		249	508	70	0	1,465
1986	290	0	109	0	0	0	363	182	290	1,597	1,198	0	4,029
1987	254	72	54	0	163	0	163	72	181	580	507	0	2,046
1988	564	55	18	164	273	36	364	255	18	1,110	0	0	2,857
1989	414	51	59	110	169	17	296	76	363	617	25	330	2,527
1990	208	149	99	69	149	50	149	0	119	1,506	179	0	2,677
1991	397	71	62	230	168	0	44	97	88	1,280	460	0	2,897
1992	526	164	33	123	189	58	340	140	394	1,356	115	0	3,468
1993	528	120	0	106	39	0	237	241	183	2,560	113	10	4,137
1994	383	28	0	82	102	0	85	66	133	2,278	286	0	3,443
Mean	312	109	39	87	133	16	323	125	218	839	315	37	2,423

[a] Talkeetna River and tributaries including Clear Creek.

[b] Other includes lakes and streams for 1977-1982.

Appendix A15.-Westside Susitna River drainage sockeye salmon harvest by fishery, 1977-1994.

Year	Alexander Creek	Deshka River	Rabideux Creek	Yentna River	Lake Creek	Fish Creek[a]	Talachulitna River	Judd Lake	Other Streams[b]	Other Lakes[b]	Total
1977	349	0			658		457	24	842	262	2,592
1978	183	0			254		141	70	662	268	1,578
1979	79	0			440		47	220	362	63	1,211
1980	52	0			267		112	267	34	181	913
1981	67	0			211		172		594	364	1,408
1982	335	0			252		63		1,320	471	2,441
1983	69	0			726		41	0	1,370	1,028	3,234
1984	87	125			374		262	312	1,395	860	3,415
1985	261	50			137		50		772	1,032	2,302
1986	0	11			547	1,273	242	514	1,173	134	3,894
1987	72	272			435	398	290	580	163	217	2,427
1988	55	146			291	146	800	182	1,038	509	3,167
1989	260	217	9	139	121	165	251	130	547	468	2,307
1990	30	189	0	20	358	89	189		646	854	2,375
1991	136	262	155	0	262	475	78	233	968	514	3,083
1992	123	82	0	107	115	189	205		1,331	764	2,916
1993	45	87		103	489	412	171		724	130	2,161
1994	38	0		237	430	142	237		653	182	1,919
Mean	125	80	41	101	354	365	212	230	811	461	2,408

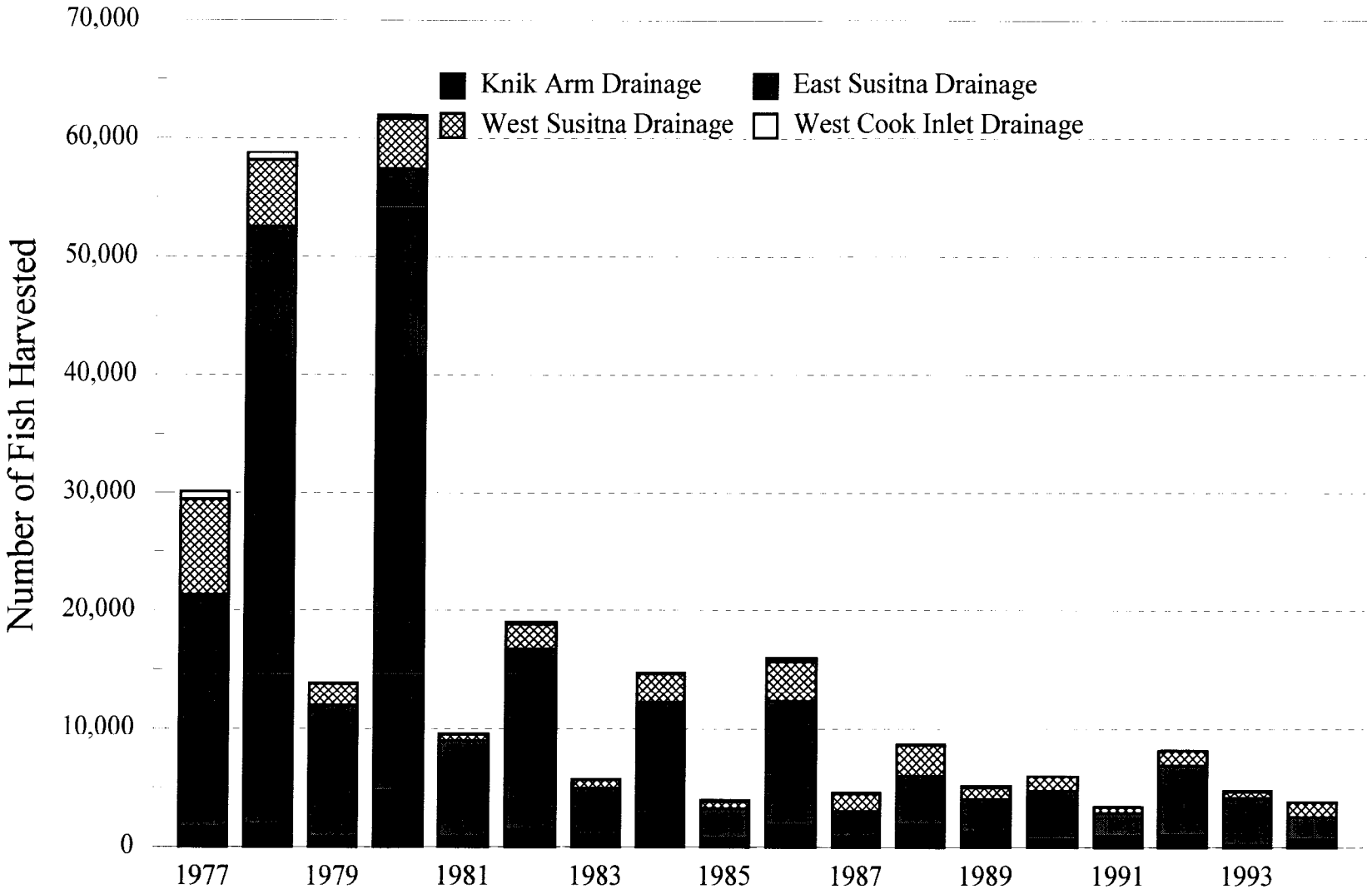
[a] Yentna River drainage.

[b] May include harvest from West Cook Inlet waters.

Appendix A16.-West Cook Inlet drainage sockeye salmon harvest by fishery, 1977-1994.

Year	Chuitna River	Theodore River	Lewis River	Other[a]	Total
1977	6	0	0		6
1978	0	0	0		0
1979	0	0	0		0
1980	0	0	0		0
1981	48	0			48
1982	10	0			10
1983	356	0			356
1984	62	0			62
1985	274	25	0		299
1986	22	67			89
1987	272	0	0		272
1988	437	18	0		455
1989	43	52	0	269	364
1990	139	50	0		189
1991	552	10	0		562
1992	8	49			57
1993	46	35	0	780	861
1994	0	9		614	623
Mean	126	18	0	554	236

[a] Includes lakes and streams.



Appendix A17.-Northern Cook Inlet Management Area recreational pink salmon harvest, 1977-1994.

Appendix A18.-Knik Arm drainage pink salmon harvest by fishery, 1977-1994.

Year	Fish Ck. Marine	Other Marine	Little Susitna	Knik River[a]	Eklutna Tailrace	Wasilla Creek	Cottonwood Creek	Big Lake[b]	Other[c]	Total
1977			1,208			217			236	1,661
1978			1,517			279			46	1,842
1979			618			136	0		64	818
1980			3,918			310	0		473	4,701
1981			709	0		96	0		29	834
1982			1,163	31		147	0		84	1,425
1983	361	209	251	47		10	0		131	1,009
1984	312	0	2,045	287	0	62	0		37	2,743
1985		0	590	175	0	0	0	22	0	787
1986		39	696	138	160	66	0	646	55	1,800
1987	0	18	217	18	217	199	0	217	0	886
1988	36	36	1,146	127	327	0	0	255	0	1,927
1989	60	69	518	164	225	69	17	199	0	1,321
1990	81	0	325	35	35	23	0	127	24	650
1991	210	149	419	9	17	0	0	122	0	926
1992	9	46	870	0	9	0	0	55	55	1,044
1993	0	0	124	0	0	0	58	38	10	230
1994	17	0	455	9	77	0	0	68	9	635
Mean	109	47	933	74	97	90	5	175	70	1,402

[a] Knik River and tributaries including Jim Creek.

[b] Big Lake drainage streams.

[c] Includes lakes and streams.

Appendix A19.-Eastside Susitna River drainage pink salmon harvest by fishery, 1977-1994.

Year	Willow Creek	Lt. Willow Creek	Kashwitna River	Caswell Creek	Sheep Creek	Goose Creek	Montana Creek	Birch Creek	Sunshine Creek	Talkeetna[a] River	Other[b]	Total
1977	7,140	1,261			4,291		3,568			1,314	2,089	19,663
1978	18,901	3,142			6,981		15,619			2,074	3,994	50,711
1979	3,445	745		100	2,418		2,472		700	645	664	11,189
1980	23,638	6,420		1,663	6,362		8,230		2,408	622	3,403	52,746
1981	2,797	604		335	1,236		1,782		958	19	412	8,143
1982	4,789	1,520		1,092	2,599		3,595		1,132	220	398	15,345
1983	1,647	157	0	126	682		902		241	73	126	3,954
1984	3,155	524	0	337	948	50	3,030		611	636	200	9,491
1985	697	169		10	10		807		468	120	229	2,510
1986	1,561	799	36	254	3,049	145	2,033	290	944	399	1,017	10,527
1987	815	109	54	36	344	18	507	0	54	272	0	2,209
1988	1,510	491	36	55	891	164	709	18	73	182	0	4,129
1989	1,045	115	0	41	288	107	288	16	436	379	0	2,715
1990	1,554	463	0	142	486	154	712		273	130	179	4,093
1991	890	203	0	19	309	58	251	0	97	135	39	2,001
1992	1,951	467	9	128	1,466	339	586	46	385	394	128	5,899
1993	1,427	243	10	36	520	36	1,147	0	19	486	17	3,941
1994	712	277	85	9	243	33	221	0	66	102	220	1,968
Mean	4,315	984	21	274	1,840	110	2,581	46	554	456	729	11,735

[a] Talkeetna River and tributaries including Clear Creek.

[b] Includes lakes and streams.

Appendix A20.-Westside Susitna River drainage pink salmon harvest by fishery, 1977-1994.

Year	Alexander Creek	Deshka River	Yentna River	Peters Creek	Lake Creek	Fish Creek[a]	Talachulitna River	Other Steams[b]	Other Lakes[b]	Total
1977	1,263	391			4,927		539	1,022	0	8,142
1978	1,146	697			2,833		31	898	0	5,605
1979	236	109			882		100	527	0	1,854
1980	809	689			2,101		276	362	0	4,237
1981	57	19			412		29	38	0	555
1982	482	377			389		220	597	0	2,065
1983	126	21			430		0	125	0	702
1984	62	748		0	636		87	922	12	2,467
1985	112	87			137		0	248	0	584
1986	413	882			670	313	235	872	0	3,385
1987	91	652			670	18	0	0	36	1,467
1988	400	800		0	491	255	18	582	36	2,582
1989	8	152	0	0	177	177	8	523	0	1,045
1990	273	297	0	0	262	48	250	108	0	1,238
1991	55	98	11	0	131	22	0	207	0	524
1992	458	513	0	0	220	37	0	27	0	1,264
1993	144	84	19	0	210	65	10	54	0	586
1994	283	564	50	17	228	102	0	15	0	1,259
Mean	357	399	13	2	878	115	100	396	5	2,253

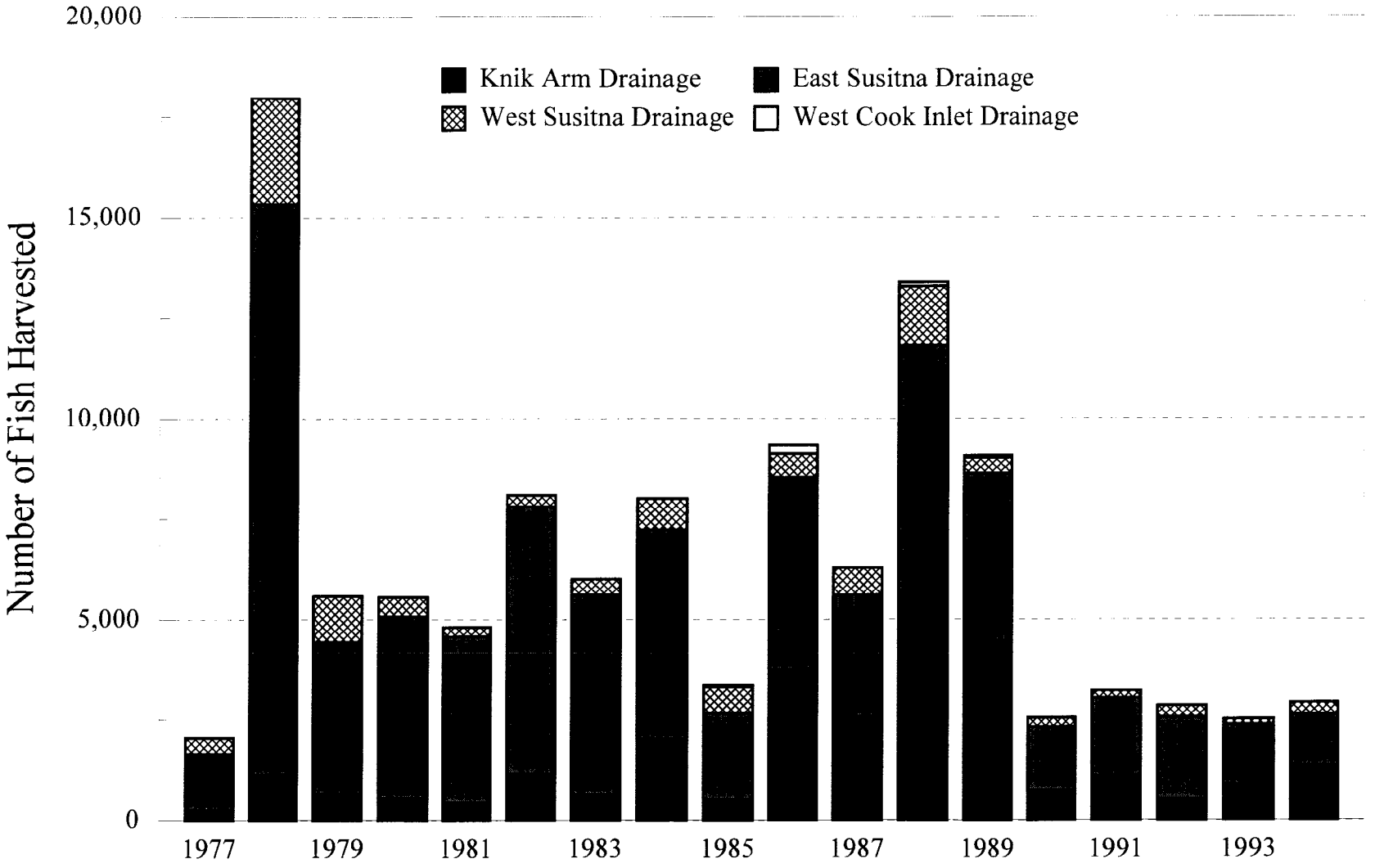
[a] Fish Lake drainage (Yentna River drainage).

[b] May include harvest from West Cook Inlet waters.

Appendix A21.-West Cook Inlet drainage pink salmon harvest by fishery, 1977-1994.

Year	Chuitna River	Theodore River	Lewis River	Other[a]	Total
1977	245	363	62		670
1978	155	449	46		650
1979	55	9	0		64
1980	69	232	0		301
1981	38	57			95
1982	147	63			210
1983	21	0			21
1984	0	62			62
1985	62	75	0		137
1986	235	45			280
1987	0	72	0		72
1988	0	55	0		55
1989	34	0	8	68	110
1990	12	12	0		24
1991	404	0	0		404
1992	18	0		0	18
1993	0	0	9	26	35
1994	0	0		8	8
Mean	83	83	11	26	179

[a] Includes lakes and streams.



Appendix A22.-Northern Cook Inlet Management Area recreational chum salmon harvest, 1977-1994.

Appendix A23.-Knik Arm drainage chum salmon harvest by fishery, 1977-1994.

Year	Fish Ck. Marine	Other Marine	Little Susitna	Knik River[a]	Eklutna Tailrace	Wasilla Creek	Cottonwood Creek	Big Lake[b]	Other[c]	Total
1977			131			17			102	250
1978			956			58			117	1,131
1979			364			45	0		245	654
1980			465			9	0		60	534
1981			278	0		58	0		96	432
1982			943	468		0	0		63	1,474
1983	84	26	450	10		0	0		73	643
1984	62	0	1,708	125	25	0	0		112	2,032
1985		66	382	11	55	0	0	0	0	514
1986		72	822	1,021	1,750	0	0	66	39	3,770
1987	0	0	534	233	1,641	146	10	10	0	2,574
1988	18	55	673	291	3,438	0	0	564	182	5,221
1989	93	92	712	435	3,043	0	0	19	83	4,477
1990	11	11	170	45	464	11	0	34	0	746
1991	8	31	425	31	379	0	155	70	0	1,099
1992	23	0	319	8	152	0	0	0	8	510
1993	0	9	500	46	293	0	37	0	0	885
1994	0	22	690	169	365	0	0	0	110	1,356
Mean	30	32	585	207	1,055	19	13	76	72	1,572

[a] Knik River and tributaries including Jim Creek.

[b] Big Lake drainage streams.

[c] Includes lakes and streams.

Appendix A24.-Eastside Susitna River drainage chum salmon harvest by fishery, 1977-1994.

Year	Willow Creek	Little Willow	Kashwitna River	Caswell Creek	Sheep Creek	Goose Creek	Montana Creek	Birch Creek	Sunshine Creek	Talkeetna River[a]	Other[b]	Total
1977	343	175			202		326			146	190	1,382
1978	2,458	1,015			1,697		4,429			1,912	2,692	14,203
1979	582	118		9	682		745		55	355	1,245	3,791
1980	989	270		19	648		571		225	385	1,445	4,552
1981	1,533	192		0	987		805		125	57	450	4,149
1982	2,086	199		0	1,750		1,708		231	31	639	6,644
1983	1,490	147	0	0	902		1,311		42	650	440	4,982
1984	2,095	224	0	112	586	125	1,447		37	337	248	5,211
1985	926	10		0	159		508		50	329	160	2,142
1986	508	109	36	218	1,307	36	871	254	545	799	73	4,756
1987	851	217	0	0	616	91	217	18	0	1,032	0	3,042
1988	1,419	546	18	18	1,892	255	928	146	36	1,255	91	6,604
1989	1,454	115	62	44	890	273	379	26	176	626	106	4,151
1990	336	197	0	35	382	278	69		12	197	59	1,565
1991	712	77	0	15	364	124	116		70	356	116	1,950
1992	471	137	0	23	342	152	182	129	23	562	23	2,044
1993	401	146	42	95	229	63	287	0	28	181	8	1,480
1994	177	90	10	0	291	29	171	0	37	450	14	1,269
Mean	1,046	221	15	37	774	143	837	82	106	537	444	4,107

[a] Talkeetna River and tributaries including Clear Creek.

[b] Includes lakes and streams.

Appendix A25.-Westside Susitna River drainage chum salmon harvest by fishery, 1977-1994.

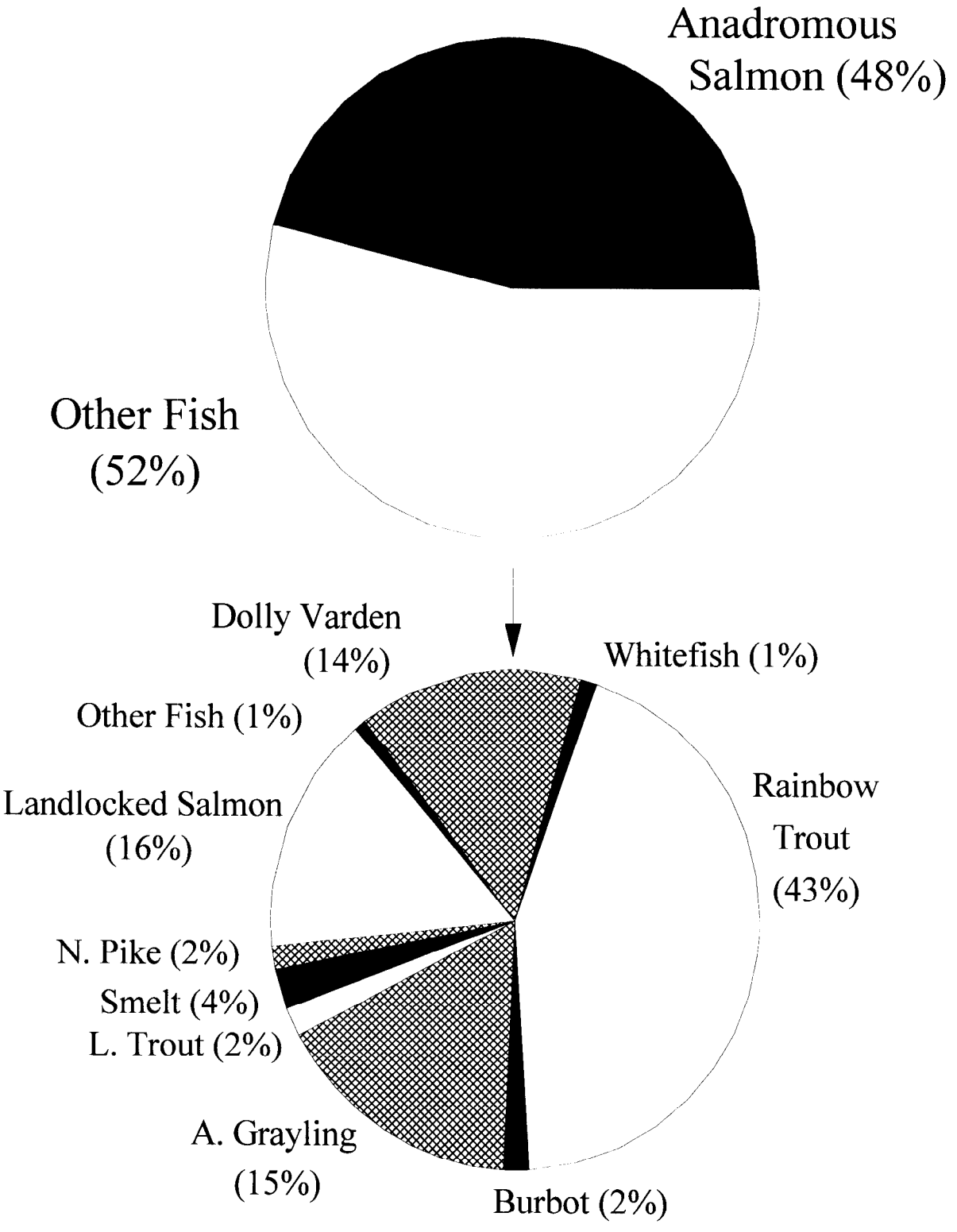
Year	Alexander Creek	Deshka River	Yentna River	Lake Creek	Fish Creek[a]	Talachulitna River	Other Streams[b]	Other Lakes[b]	Total
1977	30	0		162		37	194	0	423
1978	215	0		1,015		234	1,171	0	2,635
1979	45	0	136			55	918	0	1,154
1980	121	0	69			17	284	0	491
1981	10	0		48		0	259	0	317
1982	0	0		199		0	250	0	449
1983	0	0		52		0	346	0	398
1984	37	87		249		75	424	0	872
1985	12	25		124		0	186	0	347
1986	22	34		212	0	45	302	0	615
1987	127	54		36	0	0	471	0	688
1988	18	164		346	0	91	855	0	1,474
1989	45	0	18	163	0	72	90	27	415
1990	12	12	0	70	0	12	128	0	234
1991	61	17	0	44	17	52	0	0	191
1992	23	46	0	121	38	0	76	0	304
1993	88	0	0	25	0	0	34	0	147
1994	52	29	7	67	19	15	123	0	312
Mean	51	26	4	174	8	39	340	2	637

[a] Fish Lake drainage (Yentna drainage).

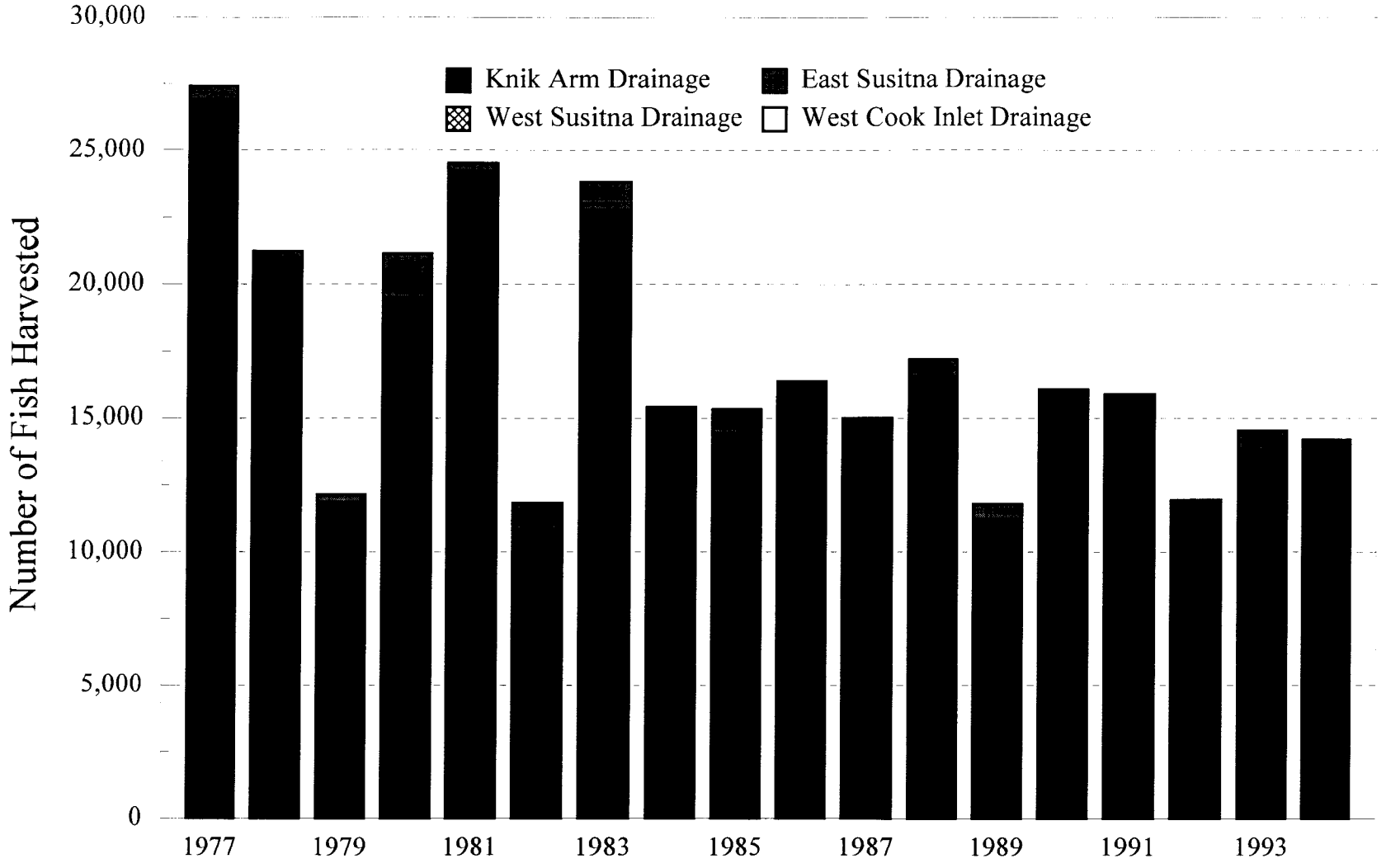
[b] May include harvest from West Cook Inlet waters.

Appendix A26.-West Cook Inlet drainage chum salmon harvest by fishery, 1977-1994.

Year	Chuitna River	Theodore River	Lewis River	Total
1977	7	0	0	7
1978	0	0	0	0
1979	0	0	0	0
1980	0	0	0	0
1981	0	0		0
1982	0	0		0
1983	10	0		10
1984	0	0		0
1985	50	0	0	50
1986	179	34		213
1987	0	0	0	0
1988	109	0	0	109
1989	0	0	0	0
1990	0	12	0	12
1991	0	0	0	0
1992	0	0		0
1993	0	0	0	0
1994	0	0	0	0
Mean	20	3	0	22



Appendix A27.-Northern Cook Inlet Management Area sport fish harvest resident fish composition, 1977-1994.



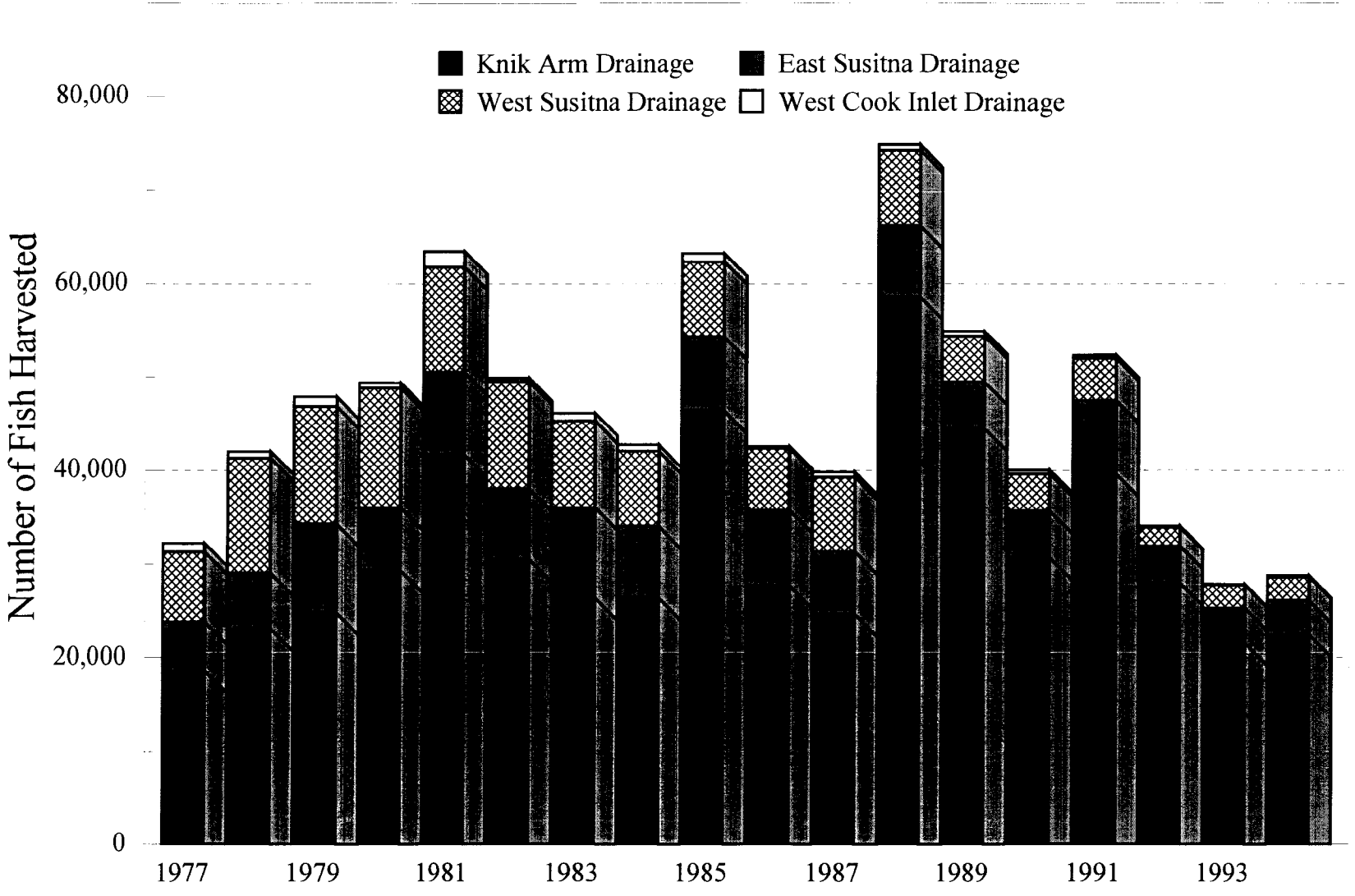
Appendix A28.-Northern Cook Inlet Management Area recreational landlocked salmon harvest, 1977-1994.

Appendix A29.-Knik Arm waters landlocked salmon harvest by fishery, 1977-1994.

Year	Memory Lake	Lucille Lake	Kepler L. Complex	Finger Lake	Wasilla Lake	Big Lake	Nancy L. Complex	Other Lakes	Total
1977		8,952	528	14,739		721	76	1,901	26,917
1978		4,963	298	8,588		226	262	4,547	18,884
1979		4,272	64	5,209	1,054	145	227	882	11,853
1980		3,633	2,807	10,685	43	189	146	1,997	19,500
1981		7,549	2,577	9,321	182	651	354	3,621	24,255
1982		3,312	681	4,506	42	324	126	1,854	10,845
1983		2,245	2,224	12,714	31	462	231	4,898	22,805
1984	1,663	2,681	773	7,282	100	1,384	50	835	14,768
1985		1,491	4,803	5,618	69	659	0	1,821	14,461
1986		246	2,580	6,244	168	0	34	5,027	14,299
1987		1,521	3,550	8,439	0	0	199	1,178	14,887
1988		618	2,183	11,896	0	0	18	1,873	16,588
1989	1,734	663	1,462	3,805	0	0	1,108	2,269	11,041
1990		279	2,314	10,453	0	0	295	2,609	15,950
1991	1,628	899	2,188	6,818	0	2,493	119	1,595	15,740
1992	1,525	173	1,222	4,965	0	1,979	162	1,849	11,875
1993	877	45	1,140	7,898	0	2,566	11	1,292	13,829
1994	1,902	0	1,821	7.480	0	2,004	129	817	14,153
Mean	1,555	2,419	1,845	8,148	94	767	197	2,270	16,258

Appendix A30.-Eastside Susitna River drainage landlocked salmon harvest, 1977-1994.

Year	Lakes Total
1977	512
1978	2,368
1979	291
1980	1,663
1981	278
1982	996
1983	1,049
1984	660
1985	884
1986	2,106
1987	145
1988	619
1989	536
1990	151
1991	259
1992	86
1993	738
1994	45
Mean	744



Appendix A31.-Northern Cook Inlet Management Area recreational rainbow trout harvest, 1977-1994.

Appendix A32.-Knik Arm drainage rainbow trout harvest by fishery, 1977-1994.

Year	Little Susitna	Knik River[a]	Wasilla Creek	Cotton-wood Ck	Big Lake[b]	Wasilla Lake	Finger Lake	Kepler L. Complex	Big Lake	Lucille Lake	Kalmbach Lake	Carpenter Lake	Knik Lake	Memory Lake	Seymour Lake	Bonnie Lakes	Nancy L. Complex	Other Streams[c]	Other Lakes	Total
1977	843		252				0	1,822	3,906	0							2,642	9,150		18,615
1978	886		45				0	5,180	4,845	0							1,853	10,330		23,139
1979	1,391		500	1,736		2,782	0	3,372	2,882	0							2,909	9,271		24,843
1980	852		121	1,085		2,084	0	5,906	5,398	0							2,540	11,382		29,368
1981	2,692	0	38	824		2,261	0	8,200	9,810	0							4,723	13,201		41,749
1982	1,551	0	63	786		2,423	0	7,325	9,369	0							2,840	6,372		30,729
1983	1,290	0	84	556		1,804	0	3,986	4,102	0							4,846	1,490	8,263	26,421
1984	860	549	312	748		848	0	9,128	4,938	0				382			1,771	1,247	5,635	26,418
1985	1,294	780	260	590	347	1,231	3,381	14,011	6,953	35							2,514	1,197	13,838	46,431
1986	1,407	235	11	145	391	1,653	3,172	7,249	5,105	168					726	736	2,200	815	3,677	27,690
1987	447	58	126	301	204	680	2,476	7,758	2,476	3,379							2,728	427	3,603	24,663
1988	1,273	382	582	782	309	891	5,421	16,462	4,220	8,495						910	5,439	964	12,497	58,627
1989	599	0	91	163	1,063	972	2,788	18,233	5,402	972	1,625		872	590	445	945	3,696	117	5,945	44,518
1990	673	0	131	410	361	443	2,544	10,223	3,282	246						738	2,182	1,131	8,335	30,699
1991	781	0	28	628	209	1,953	2,539	8,496	4,883	600			600	1,046		363	2,818	545	14,147	39,636
1992	720	0	24	404	791	483	1,860	6,839	2,090	309	610	1,116	887	364	459	1,045	2,945	8	7,041	27,995
1993	186	0	30	475	228	630	2,037	2,930	2,073	424				890	734	399	2,116	248	8,165	21,565
1994	300	0	135	425	393	735	2,666	3,551	2,260	156				323	570	1,184	1,300	56	8,392	22,446
Mean	1,003	143	157	629	430	1,367	1,605	7,815	4,666	821	1,118	1,116	786	599	587	790	2,892	3,792	8,295	31,436

[a] Knik River and tributaries including Jim Creek.

[b] Big Lake drainage streams.

[c] Includes lakes and streams, 1977-1982.

Appendix A33.-Eastside Susitna River drainage rainbow trout harvest by fishery, 1977-1994.

Year	Willow Creek	Little Willow	Kashwitna River	Caswell Creek	Sheep Creek	Goose Creek	Montana Creek	Birch Creek	Sunshine Creek	Talkeetna River[a]	Other Streams[b]	Other Lakes	Total
1977	1,055	224			368		727			450	2,401		5,225
1978	913	334			470		1,193			1,501	1,519		5,930
1979	1,500	345		282	573		1,536		382	1,373	3,472		9,463
1980	1,168	353		154	385		854		193	950	2,658		6,715
1981	1,475	374		326	201		1,111		249	1,226	3,851		8,813
1982	891	335		189	325		2,243		545	608	2,400		7,536
1983	1,689	514	357	231	409		1,332		178	1,836	1,656	1,437	9,639
1984	1,359	1,047	449	175	349	125	1,197		374	910	598	1,073	7,656
1985	2,046	746		139	191		1,248		416	832	1,266	988	7,872
1986	545	218	436	0	218	145	399	73	581	1,234	1,126	3,086	8,061
1987	1,141	1,213	471	308	507	272	417	36	72	869	471	870	6,647
1988	1,128	400	255	73	236	291	1,492	73	55	1,110	636	1,873	7,622
1989	906	277	675	37	240	240	407	37	259	822	443	629	4,972
1990	1,008	286	352	101	286	353	487		168	1,109	320	538	5,008
1991	2,044	430	261	384	569	354	615	231	0	1,076	999	891	7,854
1992	712	293	87	47	55	79	467	16	79	665	404	1,044	3,948
1993	934	264	49	148	338	127	271	0	59	242	670	611	3,713
1994	1,161	337	114	53	254	173	241	0	8	262	467	588	3,658
Mean	1,204	444	319	165	332	216	902	58	226	949	1,409	1,136	6,685

[a] Talkeetna River and tributaries including Clear Creek.

[b] Includes lakes and streams, 1977-1982.

Appendix A34.-Westside Susitna River drainage rainbow trout harvest by fishery, 1977-1994.

Year	Alexander Creek	Deshka River	Rabideux Creek	Yentna River	Peters Creek	Lake Creek	Fish Creek[a]	Judd Lake	Other Streams[b]	Other Lakes[b]	Total
1977	1,251	1,556				1,853		68	1,677	1,067	7,472
1978	2,640	3,634				2,721		0	1,528	1,772	12,295
1979	1,182	3,182				4,527		100	2,709	855	12,555
1980	1,945	4,305				2,144		86	2,101	2,204	12,785
1981	2,290	3,631				2,874			872	1,629	11,296
1982	2,505	3,804				3,134			597	1,425	11,465
1983	608	2,434				2,287		0	2,917	1,007	9,248
1984	785	2,120			611	3,080		0	1,134	399	8,129
1985	1,318	3,104				1,439			1,387	866	8,114
1986	1,553	3,038				961	45	0	614	457	6,668
1987	978	3,006				1,902	398	0	1,357	379	8,020
1988	1,419	4,075			73	1,146	109	18	672	546	8,058
1989	486	1,676	0	38	162	676	428	105	576	781	4,928
1990	640	707	17	0	303	808	135		810	540	3,960
1991	917	1,275	0	140	295	498	358	0	810	233	4,526
1992	198	459	24	127	214	214	79		349	364	2,028
1993	128	452		36	49	184	172		1,163	297	2,481
1994	207	415		123	146	714	93		613	215	2,526
Mean	1,169	2,382	10	77	232	1,731	202	34	1,216	835	7,587

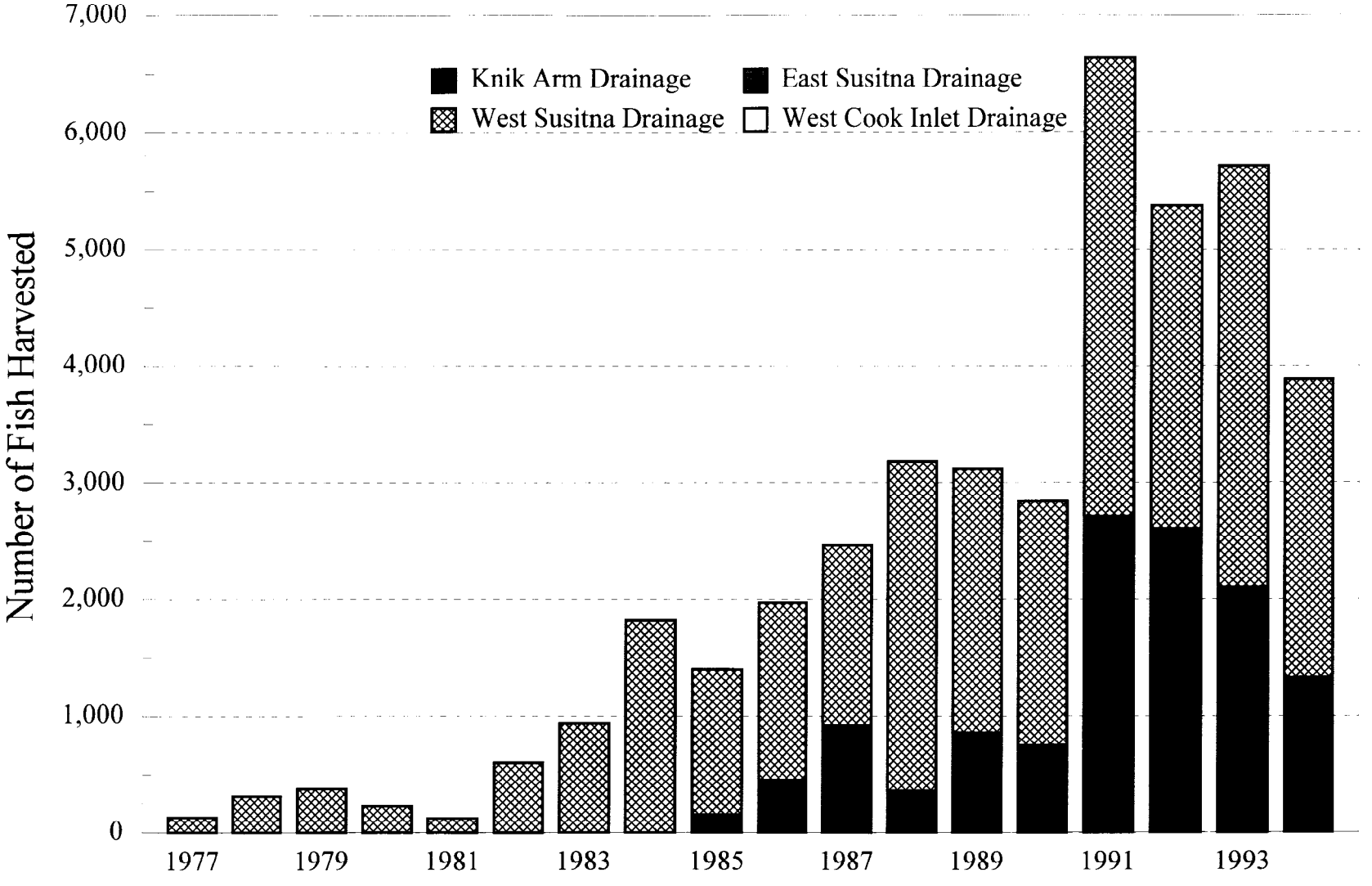
[a] Fish Lake drainage (Yentna River drainage).

[b] May include harvest from West Cook Inlet waters.

Appendix A35.-West Cook Inlet drainage rainbow trout harvest by fishery, 1977-1994.

Year	Chuitna River	Theodore River	Lewis River	Other[a]	Total
1977	509	415	34		958
1978	443	226	54		723
1979	336	609	118		1,063
1980	301	250	9		560
1981	642	1,092			1,734
1982	199	199			398
1983	441	430			871
1984	424	274			698
1985	590	225	87		902
1986	67	145			212
1987	344	199	36		579
1988	218	382	18		618
1989	162	305	19	48	534
1990	286	135	17		438
1991	171	109	124		404
1992	79	63		8	150
1993	29	27	0	49	105
1994	70	0		107	177
Mean	295	283	47	53	618

[a] Includes lakes and streams.



Appendix A36.-Northern Cook Inlet Management Area recreational northern pike harvest, 1977-1994.

Appendix A37.-Knik Arm drainage northern pike harvest by fishery, 1985-1994 (grouped with other fish prior to 1985).

Year	Little Susitna	Knik River[a]	Wasilla Creek	Cottonwood Creek	Big Lake[b]	Eklutna Tailrace	Nancy Lake[c]	Other[d]	Total
1985	0	0	0	0	0	0	156	0	156
1986	0	0	0	0	0	0	458	0	458
1987	0	0	0	0	0	0	924	0	924
1988	0	0	0	0	0	0	364	0	364
1989	0	0	0	0	0	0	863	0	863
1990	0	0	0	0	0	0	754	0	754
1991	0	0	0	0	0	0	2,406	303	2,709
1992	0	0	0	0	0	0	2,101	504	2,605
1993	0	0	0	0	0	0	1,438	664	2,102
1994	0	0	0	0	0	0	789	539	1,328
Mean	0	0	0	0	0	0	1,025	201	1,226

[a] Knik River and tributaries including Jim Creek.

[b] Big Lake drainage streams.

[c] Nancy Lake complex lakes.

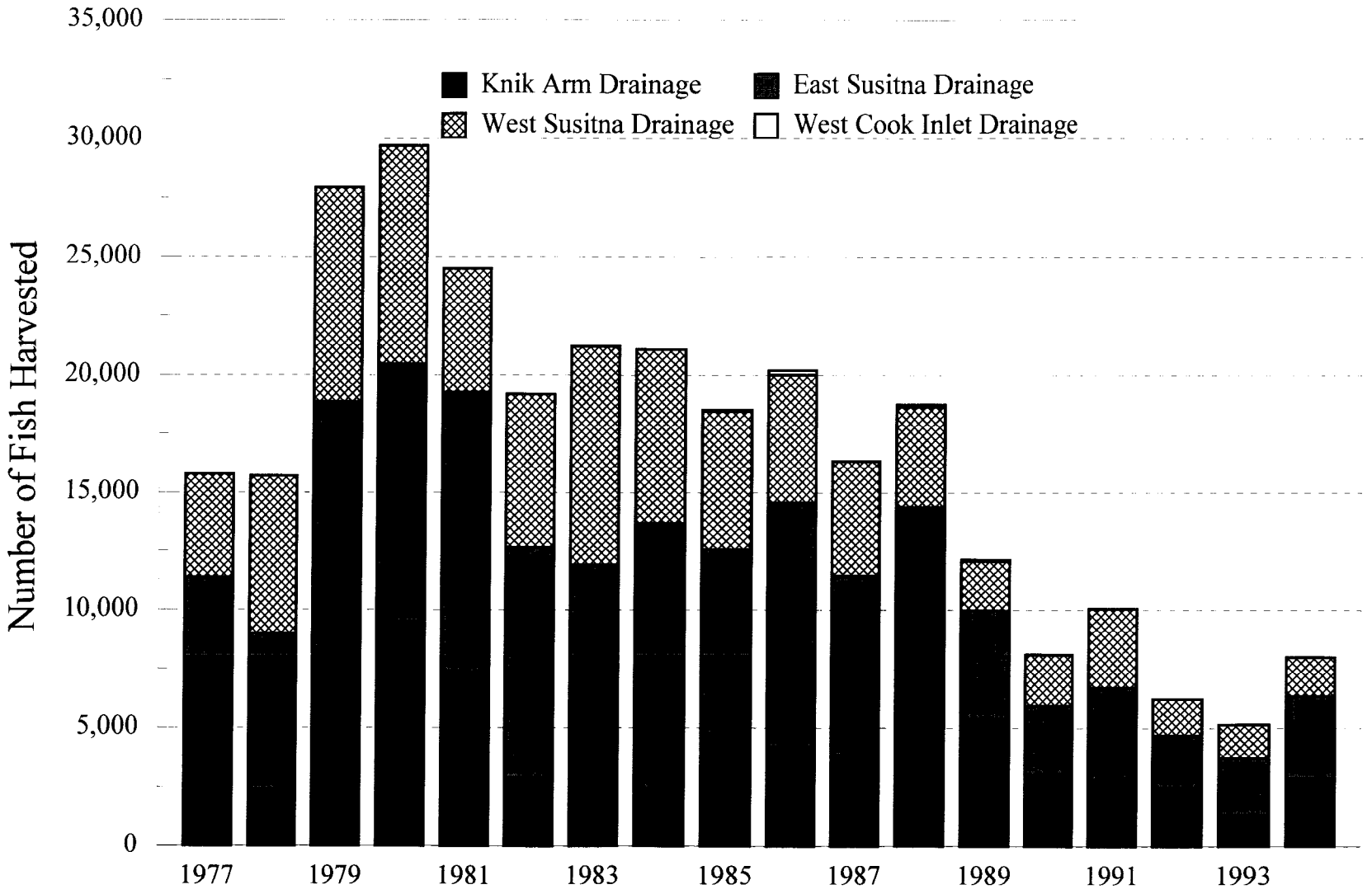
[d] Includes lakes and streams.

Appendix A38.-Westside Susitna River drainage northern pike harvest by fishery, 1977-1994.

Year	Alexander Creek	Deshka River	Peters Creek	Lake Creek	Fish Creek[a]	Trapper Lake	Other Streams[b]	Other Lakes[b]	Total
1977	0	0		42			0	90	132
1978	0	0		9			0	307	316
1979	0	0		209			0	173	382
1980	0	0		103			0	129	232
1981	0	0		0			0	125	125
1982	0	0		52			0	555	607
1983	0	0		52			105	787	944
1984	0	0	0	50			1,136	635	1,821
1985	17	0		52			156	1,023	1,248
1986	514	0		0	491		45	469	1,519
1987	254	0		0	326		0	960	1,540
1988	800	0	0	36	1,455		346	181	2,818
1989	819	0	0	0	676		381	381	2,257
1990	404	0	0	320	370		152	842	2,088
1991	700	0	0	104	921	506	13	1,687	3,931
1992	641	0	0	85	359	410	146	1,136	2,777
1993	1,202	0	0	0	1,080	694	634	9	3,619
1994	1,093	78	0	82	411	558	298	36	2,556
Mean	358	4	0	66	338	542	190	529	1,606

[a] Fish Lake drainage (Yentna River drainage).

[b] May include harvest from West Cook Inlet waters.



Appendix A39.-Northern Cook Inlet Management Area recreational Arctic grayling harvest, 1977-1994.

Appendix A40.-Knik Arm drainage Arctic grayling harvest by fishery, 1977-1994.

Year	Little Susitna R.	Finger Lake	Kepler L. Complex	Bonnie Lakes	Nancy L. Complex	Other Streams[a]	Other Lakes	Total
1977	190	0	72		0	3,654		3,916
1978	54	0	985		0	1,374		2,413
1979	36	0	2,372		0	5,963		8,371
1980	181	0	1,016		0	8,317		9,514
1981	153	0	671		0	6,572		7,396
1982	388	0	1,027		0	1,509		2,924
1983	199	0	514		0	398	3,314	4,425
1984	100	0	486		12	125	1,757	2,480
1985	191	0	277		0	260	4,040	4,768
1986	223	0	860	1,396	67	89	1,598	4,233
1987	217	54	942		307	0	2,355	3,875
1988	0	0	5,366	473	273	273	1,982	8,367
1989	73	0	3,351	436	90	227	998	5,175
1990	115	82	837	263	131	705	935	3,068
1991	60	111	1,338	433	40	30	754	2,766
1992	15	23	1,187	451	68	15	752	2,511
1993	519	73	513	56	0	42	140	1,343
1994	67	292	1,261	97	90	286	805	2,898
Mean	155	35	1,282	451	60	1,658	1,619	4,469

[a] Includes lakes, 1977-1982.

Appendix A41.-Eastside Susitna River drainage Arctic grayling harvest by fishery, 1977-1994.

Year	Willow Creek	Little Willow	Kashwitna River	Caswell Creek	Sheep Creek	Goose Creek	Montana Creek	Birch Creek	Sunshine Creek	Talkeetna River[a]	Other Streams[b]	Other Lakes	Total
1977	1,483	934			317		379			486	3,870		7,469
1978	208	334			461		958			859	3,770		6,590
1979	2,654	1,091		345	645		791		0	1,045	4,918		11,489
1980	1,868	1,156		353	725		655		0	1,348	4,854		10,959
1981	1,188	623		144	872		891		58	996	7,089		11,861
1982	1,520	377		252	723		849		42	943	5,041		9,747
1983	1,794	84	514	315	839		336		31	1,553	1,625	387	7,478
1984	2,157	1,259	1,397	162	761	125	786		287	1,784	2,042	462	11,222
1985	1,630	1,231		104	815		503		0	1,665	1,527	347	7,822
1986	218	581	436	0	218	73	472		363	3,049	4,355	581	10,346
1987	743	761	851	72	924	163	254	0	18	2,481	868	433	7,568
1988	1,692	455	418	109	400	127	418	0	36	1,000	1,092	273	6,020
1989	721	286	517	148	286	74	92	0	9	1,063	831	535	4,562
1990	1,378	50	202	17	118	34	17		0	605	304	185	2,910
1991	720	503	149	46	274	206	423	0	0	617	743	171	3,852
1992	406	240	53	23	143	75	60	0	0	383	587	219	2,189
1993	520	101	28	75	450	26	90	65	19	471	255	301	2,401
1994	467	113	142	0	159	28	80	0	0	431	1,662	402	3,484
Mean	1,187	566	428	135	507	93	447	9	54	1,154	2,524	358	7,109

[a] Talkeetna River and tributaries including Clear Creek.

[b] Includes lakes and streams, 1977-1982.

Appendix A42.-Westside Susitna River drainage Arctic grayling harvest by fishery, 1977-1994.

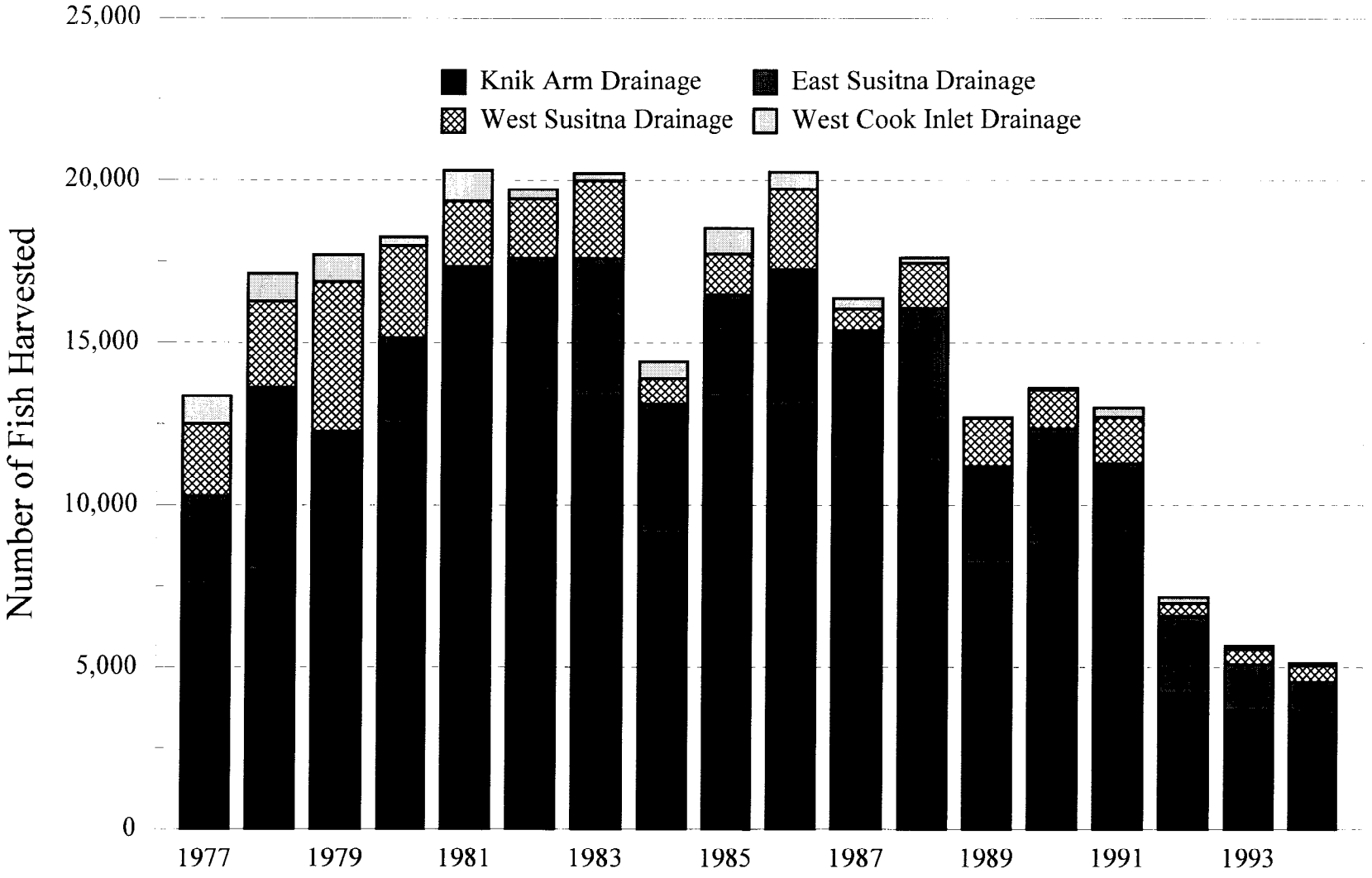
Year	Alexander Creek	Deshka River	Rabideux Creek	Moose Creek	Yentna River	Peters Creek	Lake Creek	Fish Creek[a]	Talachulitna River	Judd Lake	Other Streams[b]	Other Lakes[b]	Total
1977	280	631					1,599		832	45	619	408	4,414
1978	1,871	579					2,115		99	0	1,953	108	6,725
1979	745	1,463					1,963		664	45	3,691	518	9,089
1980	1,145	1,817					1,972		1,713	232	1,808	560	9,247
1981	1,130	1,255					1,600		479		546	240	5,250
1982	1,582	1,457					1,955		587		734	210	6,525
1983	483	1,280					2,224		3,178	21	1,782	346	9,314
1984	362	1,110				150	2,257		898	75	2,395	162	7,409
1985	988	1,335					1,266		434		1,664	208	5,895
1986	1,273	938		771			983	112	290	0	1,040	34	5,441
1987	1,050	942					1,322	91	272	36	1,141	54	4,908
1988	891	1,164				164	637	0	1,128	0	291	0	4,275
1989	267	457	0	67	76	114	314	38	466	19	76	210	2,104
1990	118	152	0		0	303	825	0	337		389	34	2,158
1991	346	333	0		0	213	705	466	1,051	0	253	0	3,367
1992	60	105	45		0	293	301	8	225		497	38	1,572
1993	0	89			0	166	207	28	132		744	56	1,422
1994	107	61			0	254	553	31	204		314	130	1,654
Mean	705	843	11	419	13	207	1,267	86	722	43	1,108	184	5,043

[a] Fish Lake drainage (Yentna River drainage).

[b] May include harvest from West Cook Inlet waters.

Appendix A43.-West Cook Inlet drainage Arctic grayling harvest by fishery, 1977-1994.

Year	Chuitna River	Theodore River	Lewis River	Other	Total
1977	0	0	0		0
1978	0	0	0		0
1979	0	0	0		0
1980	0	0	0		0
1981	0	0			0
1982	0	0			0
1983	0	10			10
1984	0	37			37
1985	0	0	0		0
1986	89	0			89
1987	36	0	0		36
1988	0	0	0		0
1989	57	86	0		143
1990	17	17	0		34
1991	13	13	0		26
1992	0	0			0
1993	0	0	0		0
1994	0	0	0	8	
Mean	12	10	0	8	21



Appendix A44.-Northern Cook Inlet Management Area recreational Dolly Varden/Arctic char harvest, 1977-1994.

Appendix A45.-Knik Arm drainage Dolly Varden/Arctic char harvest by fishery, 1977-1994.

Year	Marine	Little Susitna	Knik River[a]	Eklutna Tailrace	Wasilla Creek	Cotton-wood Ck	Fish Creek[b]	Wasilla Lake	Big Lake	Nancy L. Complex	Other Streams[c]	Other Lakes	Total
1977		645			328				4,953	277	1,338		7,541
1978		570			325				5,433	18	1,636		7,982
1979		1,191			364	191		264	4,227	118	2,227		8,582
1980		1,748			189	439		181	7,585	327	2,015		12,484
1981		2,529	1,130		690	67		38	7,741	345	1,935		14,475
1982		1,331	1,279		1,289	10		63	8,793	272	503		13,540
1983	21	1,227	1,310		1,290	157		167	6,126	1,154	1,531	408	13,391
1984	112	1,272	1,509	50	25	0		50	3,866	150	1,696	373	9,103
1985	17	1,791	2,011	104	0	0	104	225	8,096	17	711	260	13,336
1986	0	838	3,094	56	246	45	168	11	7,406	168	625	391	13,048
1987	126	380	127	869	869	0	36	36	8,638	163	145	36	11,425
1988	401	564	2,237	309	0	36	36	273	5,930	1,055	146	327	11,314
1989	63	763	1,507	118	18	191	517	0	4,467	155	181	163	8,143
1990	147	821	1,822	98	0	164	16	0	4,907	66	147	558	8,746
1991	427	747	934	187	1,841	213	0	0	4,162	80	361	186	9,138
1992	8	524	541	25	16	0	16	57	2,597	33	953	301	5,071
1993	0	292	536	195	203	0	185	0	1,812	165	230	68	3,686
1994	9	162	566	36	556	134	124	0	1,489	66	135	255	3,532
Mean	74	966	1,034	114	458	92	67	76	5,457	257	918	277	9,697

[a] Knik River and tributaries including Jim Creek.

[b] Big Lake drainage.

[c] Includes lakes and streams, 1977-1982.

Appendix A46.-Eastside Susitna River drainage Dolly Varden/Arctic char harvest by fishery, 1977-1994.

Year	Willow Creek	Little Willow	Kashwitna River	Caswell Creek	Sheep Creek	Goose Creek	Montana Creek	Birch Creek	Sunshine Creek	Talkeetna River[a]	Other Streams[b]	Lakes	Total
1977	863	139			94		300			379	951		2,726
1978	280	63			108		633			1,817	2,739		5,640
1979	618	336		91	127		527		264	827	909		3,699
1980	636	122		83	83		167		39	751	790		2,671
1981	249	48		38	57		240		10	1,418	814		2,874
1982	262	189		73	409		356		42	1,069	1,666		4,066
1983	336	73	304	157	52		325		84	1,962	789	126	4,208
1984	424	100	212	25	125	0	661		125	2,020	187	125	4,004
1985	538	520		35	104		17		0	1,352	572	0	3,138
1986	71	0	327	0	182	0	327	0	508	2,396	182	218	4,211
1987	308	54	380	109	72	36	235	18	0	2,680	18	36	3,946
1988	728	200	218	73	182	0	291	0	0	2,146	910	0	4,748
1989	370	28	268	0	120	18	185	0	0	1,719	64	268	3,040
1990	538	67	386	17	50	34	84		0	2,369	68	0	3,613
1991	227	60	72	0	263	60	167	24	0	1,171	36	60	2,140
1992	320	107	25	8	25	90	41	41	0	1,647	0	90	2,394
1993	170	49	39	0	117	10	10	18	0	971	19	10	1,413
1994	118	27	18	18	63	18	46	0	0	520	205	0	1,033
Mean	392	121	125	40	124	15	256	6	60	1,512	607	78	3,309

[a] Talkeetna River and tributaries including Clear Creek.

[b] Includes lakes and streams, 1977-1982.

Appendix A47.-Westside Susitna River drainage Dolly Varden/ Arctic char harvest by fishery, 1977-1994.

Year	Alexander Creek	Deshka River	Peters Creek	Lake Creek	Fish Creek[a]	Talachulitna River	Judd Lake	Other Streams[b]	Other Lakes[b]	Total
1977	53	0		122		252	195	1,279	345	2,246
1978	136	0		154		235	371	1,220	551	2,667
1979	182	0		164		155	573	2,872	645	4,591
1980	353	0		121		982	723	603	43	2,825
1981	287	10		67		10		1,130	499	2,003
1982	42	0		482		31		471	818	1,844
1983	136	0		262		105	252	669	1049	2,473
1984	75	25	12	125		50	262	212	37	798
1985	0	139		87		87		642	312	1,267
1986	34	134		0	78	101	514	1,609	0	2,470
1987	0	72		36	36	0	254	163	127	688
1988	236	273	0	91	0	382	0	401	18	1,401
1989	171	86	0	124	38	10	19	257	780	1,485
1990	0	84	269	101	0	84		372	270	1,180
1991	0	0	0	65	327	261	33	440	310	1,436
1992	0	8	0	8	41	66		40	237	400
1993	47	29	0	9	10	9		359	0	463
1994	0	0	18	44	0	103		342	0	507
Mean	97	48	17	115	29	162	213	727	336	1,708

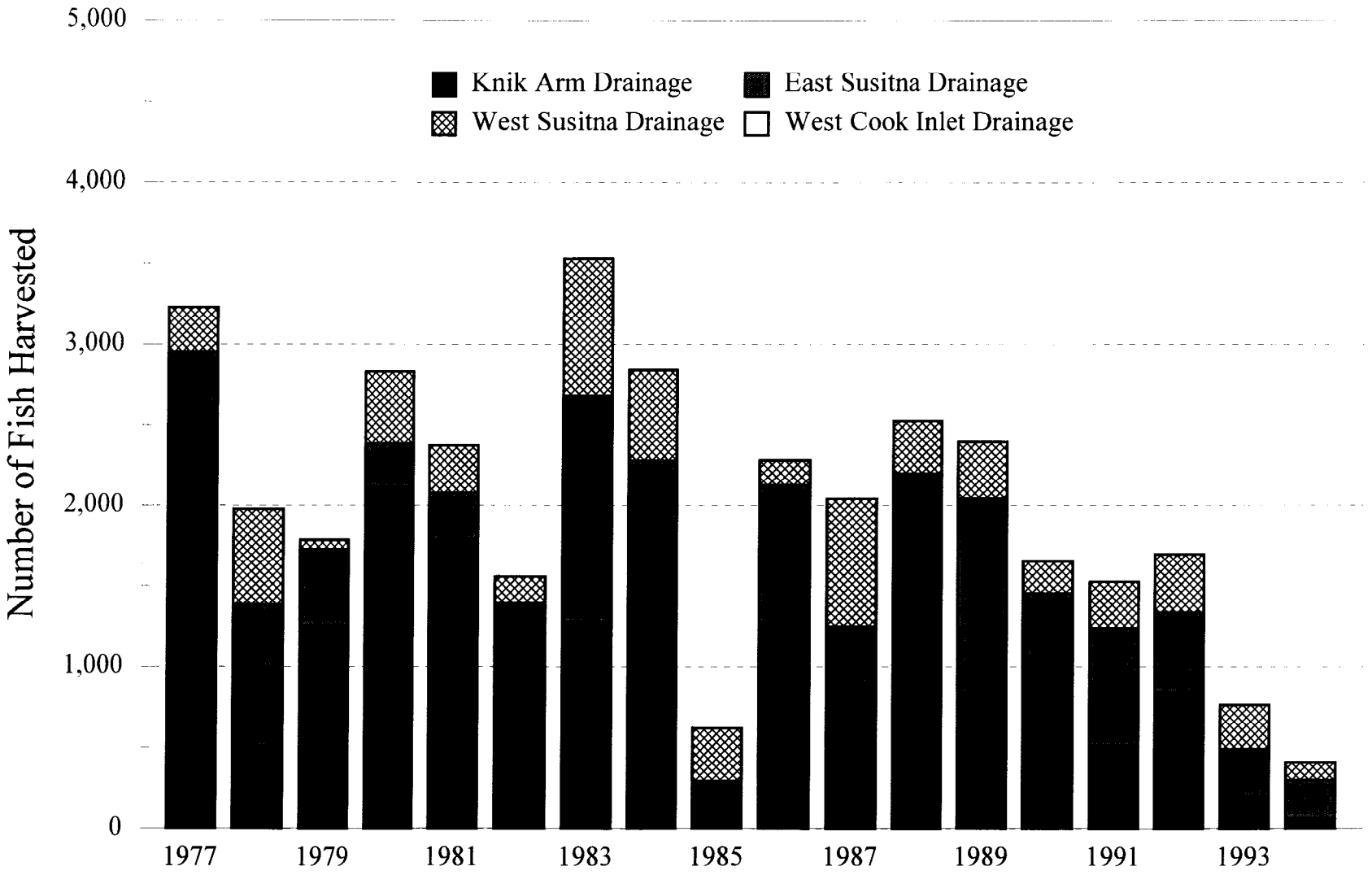
[a] Fish Lake drainage (Yentna River drainage).

[b] May include harvest from West Cook Inlet waters.

Appendix A48.-West Cook Inlet drainage Dolly Varden/Arctic char harvest by fishery, 1977-1994.

Year	Chuitna River	Theodore River	Lewis River	Other[a]	Total
1977	671	181	0		852
1978	461	353	27		841
1979	664	173	9		846
1980	146	129	0		275
1981	843	115			958
1982	304	0			304
1983	209	21			230
1984	511	12			523
1985	260	538	0		798
1986	235	302			537
1987	18	199	109		326
1988	164	0	0		164
1989	10	0	19		29
1990	34	17	0		51
1991	229	33	33		295
1992	131	74			205
1993	73	10	0	29	112
1994	45	0		28	73
Mean	278	120	18	29	412

[a] Includes lakes and streams.



Appendix A49.-Northern Cook Inlet Management Area recreational lake trout harvest, 1977-1994.

Appendix A50.-Knik Arm drainage lake trout harvest by fishery, 1977-1994.

Year	Little Susitna R.	Big Lake Drainage[a]	Big Lake[b]	Nancy L. Complex	Other Lakes[c]	Other Streams	Total
1977	0		665	336	1,259		2,260
1978	0		0	127	680		807
1979	0		455	145	654		1,254
1980	0		594	749	775		2,118
1981	0		623	354	814		1,791
1982	0		440	356	363		1,159
1983	31		441	304	503	0	1,279
1984	0		798	549	572	0	1,919
1985	0	0	156	104	0	17	277
1986	0	34	0	201	78	0	313
1987	91	0	0	562	253	0	906
1988	91	0	0	691	1,129	0	1,911
1989	0	0	0	472	363	0	835
1990	0	0	0	558	509	0	1,067
1991	0	0	0	211	271	30	512
1992	0	0	0	377	401	62	840
1993	0	0	0	102	81	18	201
1994	0	0	0	0	66	0	66
Mean	12	3	232	344	487	7	1,084

[a] Big Lake drainage streams.

[b] Big Lake proper, not including drainage streams.

[c] Includes lakes and streams, 1977-1982.

Appendix A51.-Eastside Susitna River lake trout harvest, 1977-1994.

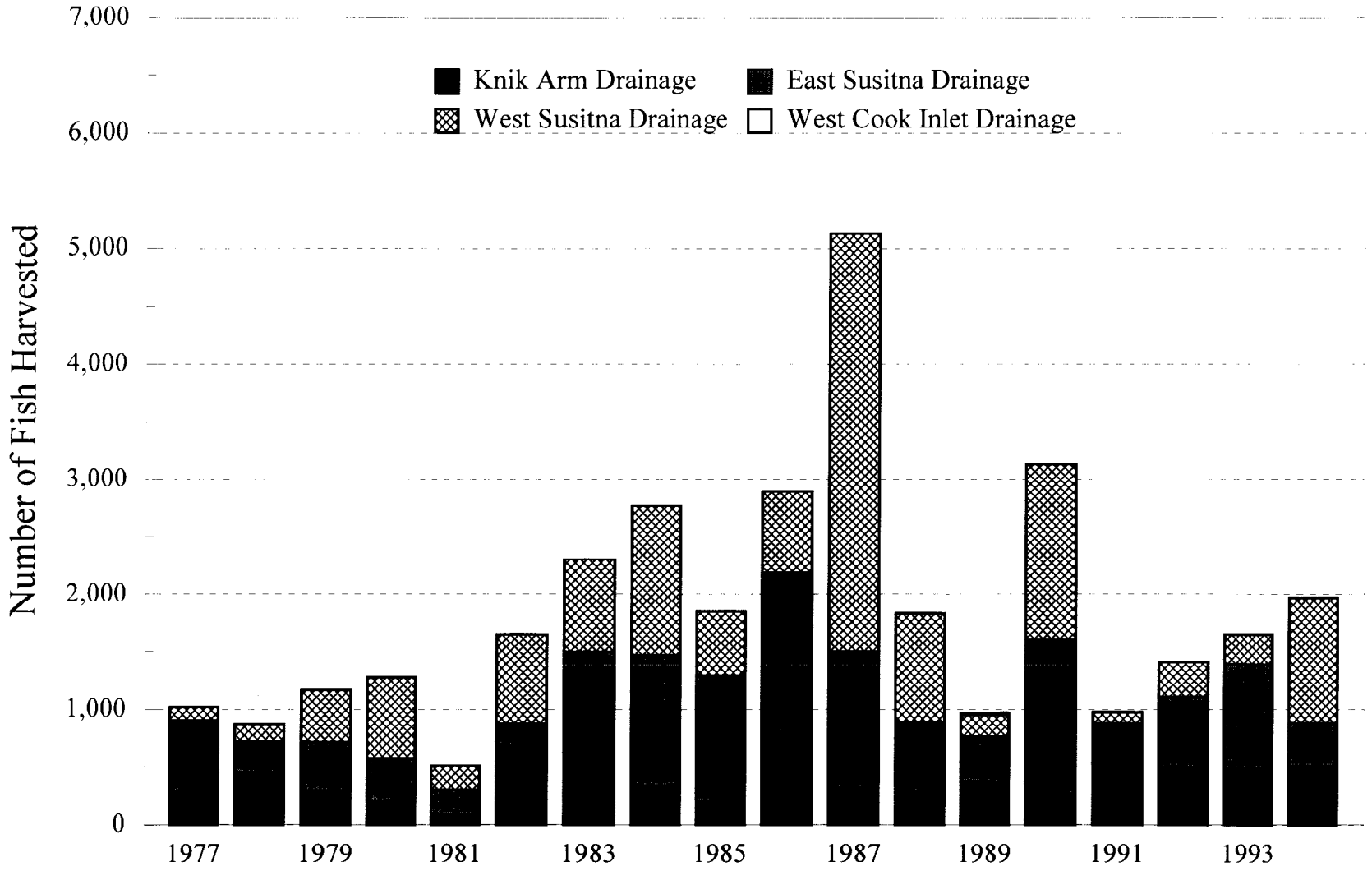
Year	Streams	Lakes	Total
1977		693	693
1978		877	877
1979		472	472
1980		267	267
1981		287	287
1982		335	335
1983	63	1,341	1,404
1984	25	337	362
1985	0	17	17
1986	218	1,598	1,816
1987	0	343	343
1988	0	291	291
1989	83	1,127	1,210
1990	17	370	387
1991	81	645	726
1992	39	456	495
1993	41	247	288
1994	4	228	232
Mean	48	552	583

Appendix A52.-Westside Susitna River drainage lake trout harvest by fishery, 1977-1994.

Year	Alexander Creek	Deshka River	Yentna River	Lake Creek	Fish Lakes[a]	Shell Lake	Judd Lake	Other Streams[b]	Other Lakes[b]	Total
1977	0	0		116		23	8	23	108	278
1978	0	0		36		45	0	0	515	596
1979	0	0		9		18	0	36	0	63
1980	0	0		0		69	0	181	198	448
1981	0	0		19				0	278	297
1982	0	0		0		52		0	115	167
1983	0	0		0		409	0	10	430	849
1984	0	0		0			0	125	437	562
1985	0	0		121				0	207	328
1986	0	56		0	0		0	0	101	157
1987	0	36		0	18		0	109	634	797
1988	0	0		36	0		18	0	273	327
1989	0	0	38	0	0		0	0	314	352
1990	0	17	0	84	0			0	101	202
1991	0	0	0	61	0		0	46	182	289
1992	0	39	0	0	0			77	247	363
1993	0	0	0	0	0			189	87	276
1994	0	0	0	77	36			0	0	113
Mean	0	8	6	31	6	103	2	44	235	359

[a] Fish Lake drainage (Yentna River drainage).

[b] May include harvest from West Cook Inlet waters.



Appendix A53.-Northern Cook Inlet Management Area recreational burbot harvest, 1977-1994.

Appendix A54.-Knik Arm drainage burbot harvest by fishery, 1977-1994.

Year	Little Susitna	Knik River[a]	Fish Creek[b]	Wasilla Lake	Big Lake	Nancy L. Complex	Other Streams[c]	Other Lakes	Total
1977	6				73	148	63		290
1978	9				18	145	280		452
1979	55			0	0	9	227		291
1980	9			0	43	34	224		310
1981	29	0		0	0	29	29		87
1982	10	0		0	461	210	0		681
1983	52	0		0	94	357	31	63	597
1984	25	0		0	75	62	37	137	336
1985	35	0	0	0	70	105	0	0	210
1986	22	0	0	0	335	34	0	413	804
1987	54	0	18	0	36	217	0	0	325
1988	36	0	0	0	55	127	0	73	291
1989	27	0	0	0	163	82	0	100	372
1990	82	0	0	0	82	98	0	0	262
1991	40	13	0	0	66	358	0	0	477
1992	102	0	0	0	110	118	0	170	500
1993	43	0	107	0	278	54	0	0	482
1994	10	0	140	0	279	83	0	0	512
Mean	36	1	15	0	124	126	50	80	404

[a] Knik River and tributaries including Jim Creek.

[b] Big Lake drainage.

[c] Includes lakes and streams, 1977-1982.

Appendix A55.-Eastside Susitna River drainage burbot harvest by fishery, 1977-1994.

Year	Willow Creek	Little Willow	Kashwitna River	Caswell Creek	Sheep Creek	Goose Creek	Montana Creek	Birch Creek	Sunshine Creek	Talkeetna River[a]	Other Streams[b]	Lakes	Total
1977	26	0			45		110			0	438		619
1978	9	0			18		9			27	208		271
1979	18	0		0	64		9		45	9	282		427
1980	0	0		26	45		13		39	32	212		367
1981	48	0		0	0		0		115	0	57		220
1982	63	0		0	0		0		73	0	63		199
1983	21	0	0	31	10		0		367	84	126	262	901
1984	0	0	12	87	648	37	75		100	62	112	0	1,133
1985	105	175		70	0		0		0	420	315	0	1,085
1986	0	0	109	0	0	0	0	73	835	0	290	73	1,380
1987	0	54	18	127	18	72	72	72	344	145	253	0	1,175
1988	18	0	18	309	18	0	0	0	73	55	0	109	600
1989	9	18	46	18	0	9	0	65	185	9	18	18	395
1990	84	0	34	185	34	269	0		638	67	34	0	1,345
1991	0	55	22	66	11	44	22	77	0	88	22	0	407
1992	0	0	0	110	0	51	0	144	68	211	16	8	608
1993	21	85	0	32	75	0	0	118	133	310	135	0	909
1994	0	17	13	228	0	0	0	31	228	74	31	52	674
Mean	23	22	15	72	55	27	17	32	180	89	145	44	706

[a] Talkeetna River and tributaries including Clear Creek.

[b] Includes lakes and streams, 1977-1982.

Appendix A56.-Westside Susitna River drainage burbot harvest by fishery, 1977-1994.

Year	Alexander Creek	Deshka River	Yentna River	Lake Creek	Fish Lakes[a]	Rabideux Creek	Other Streams[b]	Other Lakes[b]	Total
1977	0	3		42			51	19	115
1978	0	0		0			117	36	153
1979	36	309		64			45	0	454
1980	0	224		0			448	34	706
1981	29	96		29			57	0	211
1982	84	252		0			10	430	776
1983	0	126		283			125	273	807
1984	12	237		100			199	761	1,309
1985	0	140		140			105	175	560
1986	0	257		67	89		302	0	715
1987	18	1,123		507	145		1,738	109	3,640
1988	36	36		327	218		127	200	944
1989	0	96	19	0	19		58	0	192
1990	51	118	34	556	438		84	253	1,534
1991	9	35	0	0	9	35	9	0	97
1992	0	42	0	0	76	76	76	34	304
1993	11	42	0	0	21		190	0	264
1994	0	115	166	45	135		598	31	1,090
Mean	16	181	37	120	128	56	241	131	771

[a] Fish Lake drainage (Yentna River drainage).

[b] May include harvest from West Cook Inlet waters.

Appendix A57.-Knik Arm drainage smelt harvest by fishery, 1985-1994 (grouped with other fish prior to 1985).

Year	Marine Fish Creek	Other Marine	Freshwater	Total
1985	0	560	0	560
1986	0	3,351	0	3,351
1987	0	0	0	0
1988	0	0	0	0
1989	0	0	0	0
1990	0	0	0	0
1991	0	0	0	0
1992	0	0	0	0
1993	0	0	0	0
1994	0	2,292	0	2,292
Mean	0	620	0	620

Appendix A58.-Westside Susitna River drainage smelt harvest by fishery, 1985-1994 (grouped with other fish prior to 1985).

Year	Alexander Creek	Deshka River	Yentna River	Lake Creek	Other Streams[a]	Total
1985	0	0		0	1,680	1,680
1986	0	7,300		0	0	7,300
1987	0	0		0	9,265	9,265
1988	1,547	0		1,083	6,219	8,849
1989	0	0	0	785	1,539	2,324
1990	707	842	3,368	674	0	5,591
1991	3,774	245	0	0	2,113	6,132
1992	379	0	1,082	0	14,062	15,523
1993	0	2,236	0	0	4,360	6,596
1994	0	458	3,438	235	5,352	9,483
Mean	641	1,108	1,315	278	4,459	7,274

[a] May include harvest from West Cook Inlet waters.

Appendix A59.-Knik Arm drainage whitefish harvest by fishery, 1985-1994 (grouped with other fish prior to 1985).

Year	Little Susitna	Knik River[a]	Eklutna Tailrace	Wasilla Creek	Cottonwood Creek	Big Lake[b]	Wasilla Lake	Big Lake	Nancy L. Complex	Other Streams[c]	Other Lakes	Total
1985	587	0	0	0	0	0	0	0	0	0	0	587
1986	134	424	0	0	0	0	11	0	11	0	0	580
1987	199	18	0	0		0	36	0	127	0	0	380
1988	673	327	18	0	0	18	0	18	91	18	0	1,163
1989	599	118	9	0	0	100	0	9	9	0	0	844
1990	443	98	0	0	0	0	0	16	65	0	0	622
1991	732	42	0	0	0	0	84	0	42	0	0	900
1992	138	18	0	0	0	0	0	0	101	0	0	257
1993	157	9	0	0	0	0	35	0	0	0	26	227
1994	170	0	0	0	0	7	0	48	17	0	0	242
Mean	383	105	3	0	0	13	17	9	46	2	3	580

[a] Knik River and tributaries including Jim Creek.

[b] Big Lake drainage streams.

[c] Includes lakes and streams, 1977-1982.

Appendix A60.-Eastside Susitna River drainage whitefish harvest by fishery, 1984-1994 (grouped with other fish prior to 1984).

Year	Lt. Willow Creek	Willow Creek	Kashwitna River	Caswell Creek	Sheep Creek	Goose Creek	Montana Creek	Sunshine Creek	Birch Creek	Talkeetna River[a]	Other Streams	Lakes	Total
1984	62	349	150	12	37	0	175	175		49	49	0	1,058
1985	350	245		0	105		0	560		105	0	0	1,365
1986	0	73	0	0	0	0	0	581	73	363	0	0	1,090
1987	0	72	36	109	18	0	72	109	36	272	72	0	796
1988	18	218	0	18	55	0	91	0	0	146	0	0	546
1989	0	111	83	0	102	18	18	0	0	46	64	0	442
1990	0	403	101	34	101	0	0	50		319	34	336	1,378
1991	235	188	0	31	94	0	0	0	0	78	0	0	626
1992	28	64	9	18	9	28	18	9	9	55	0	18	265
1993	0	35	0	0	26	9	0	0	0	17	0	0	87
1994	39	58	10	10	19	19	0	0	0	0	17	0	172
Mean	67	165	39	21	51	7	34	135	15	132	21	32	711

[a] Talkeetna River and tributaries including Clear Creek.

Appendix A61.-Westside Susitna River drainage whitefish harvest by fishery, 1985-1994 (grouped with other fish prior to 1985).

Year	Alexander Creek	Deshka River	Yentna River	Lake Creek	Fish Lakes[a]	Talachulitna River	Other Streams[b]	Other Lakes[b]	Total
1985	0	175		315	0	0	0	35	525
1986	112	156		145	11	0	11	0	435
1987	127	163		851	272	0	163	109	1,685
1988	637	564		91	91	0	36	0	1,419
1989	95	86	0	10	10	38	143	0	382
1990	152	488	0	623	67	0	51	0	1,381
1991	120	199	27	106	0	0	67	0	519
1992	0	193	18	0	28	0	45	56	340
1993	82	351	105	0	8	0	9	0	555
1994	23	110	0	240	116	0	290	0	779
Mean	135	249	25	238	60	4	82	20	802

[a] Fish Lake drainage (Yentna drainage).

[b] May include harvest from West Cook Inlet waters.

Appendix A62.-West Cook Inlet drainage whitefish harvest by fishery, 1985-1994 (grouped with other fish prior to 1985).

Year	Chuitna River	Theodore River	Lewis River	Other[a]	Total
1985	0	0	0		0
1986	0	0			0
1987	0	0	0		0
1988	0	0	0		0
1989	0	48	0		48
1990	0	135	0		135
1991	0	0	0		0
1992	0	23	0		23
1993	0	0	0	9	9
1994	0	0		0	0
Mean	0	21	0	5	22

[a] Includes lakes and streams.

Appendix A63.-Knik Arm drainage other fish (includes smelt, whitefish and northern pike prior to 1985) harvest by fishery, 1977-1994.

Year	Marine	Little Susitna	Knik River[a]	Eklutna Tailrace	Wasilla Creek	Cotton-wood Ck	Fish Creek[b]	Wasilla Lake	Big Lake	Nancy L. Complex	Other Streams[c]	Other Lakes	Total
1977		77			0				17	57	229		380
1978		759			0				0	0	36		795
1979		291			0	55		27	55	9	0		437
1980		1,059			0	0		0	0	43	34		1,136
1981		690	0		0	0		38	10	19	19		776
1982		713	0		0	0		0	0	73	31		817
1983	52	136	0		0	0		0	0	241	0	0	429
1984	0	87	0	0	0	0		75	12	125	0	150	449
1985	0	0	0	0	0	0	35	87	0	0	0	35	157
1986	0	0	0	0	0	0	0	0	24	0	0	0	24
1987	0	0	0	0	0	0	0	0	0	462	0	0	462
1988	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	227	227
1990	0	0	0	0	0	0	0	0	0	0	99	0	99
1991	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	389	141	0	0	260	0	0	0	0	0	22	812
1993	157	19	0	0	0	0	0	0	0	0	0	0	176
1994	0	0	0	33	0	0	0	0	74	0	0	56	163
Mean	17	234	8	2	0	18	2	13	11	57	25	41	408

[a] Knik River and tributaries including Jim Creek.

[b] Big Lake drainage.

[c] Includes lakes and streams, 1977-1982.

Appendix A64.-Eastside Susitna River drainage other fish (includes smelt, whitefish, and northern pike prior to 1984) harvest by fishery, 1977-1994.

Year	Willow Creek	Little Willow	Kashwitna River	Caswell Creek	Sheep Creek	Goose Creek	Montana Creek	Birch Creek	Sunshine Creek	Talkeetna River[a]	Other Streams[b]	Lakes	Total
1977	218	57			0		133			23	195		626
1978	27	0			9		27			0	90		153
1979	45	0		36	191		91		273	64	73		773
1980	116	13		26	0		13		0	32	520		720
1981	38	0		96	86		19		0	38	29		306
1982	63	0		0	21		10		42	10	199		345
1983	52	0	157	10	0		52		0	126	51	21	469
1984	125	0	0	0	0	0	25		0	0	0	75	225
1985	0	0		0	0		0		0	0	0	0	0
1986	0	0	0	0	0	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	15	0	0	0	0	0	0	0	0	0	0	0	15
1990	0	0	0	0	0	0	0		0	0	0	67	67
1991	16	0	0	0	0	0	0	0	0	0	0	0	16
1992	54	0	0	0	0	0	0	0	0	0	0	22	76
1993	29	0	0	0	0	20	0	0	0	0	0	0	49
1994	0	9	0	0	92	0	0	0	0	56	0	9	166
Mean	44	4	9	9	22	1	21	0	18	19	64	16	223

[a] Talkeetna River and tributaries including Clear Creek.

[b] Includes lakes and streams, 1977-1982.

Appendix A65.-Westside Susitna River drainage other fish (includes smelt, whitefish and northern pike prior to 1985) harvest by fishery, 1977-1994.

Year	Alexander Creek	Deshka River	Peters Creek	Lake Creek	Fish Creek[a]	Talachulitna River	Other Streams[b]	Lakes[b]	Total
1977	59	68		14			342	68	551
1978	181	72		18			63	36	370
1979	145	82		109			55	0	391
1980	0	69		0			0	34	103
1981	0	19		19			48	0	86
1982	178	115		63			10	0	366
1983	21	430		10			0	0	461
1984	187	212	0	137			50	12	598
1985	35	0		69			0	0	104
1986	0	0		0	0		0	0	0
1987	31	0		0	0		0	0	31
1988	0	0	0	0	0		0	0	0
1989	0	0	0	0	0		0	0	0
1990	17	0	0	34	0		0	0	51
1991	21	0	0	0	0	0	43	0	64
1992	0	22	0	0	0	0	0	0	22
1993	0	0	0	0	0	0	49	0	49
1994	0	0	0	28	0	0	18	38	84
Mean	49	61	0	28	0	0	38	10	185

[a] Fish Lake drainage (Yentna River drainage).

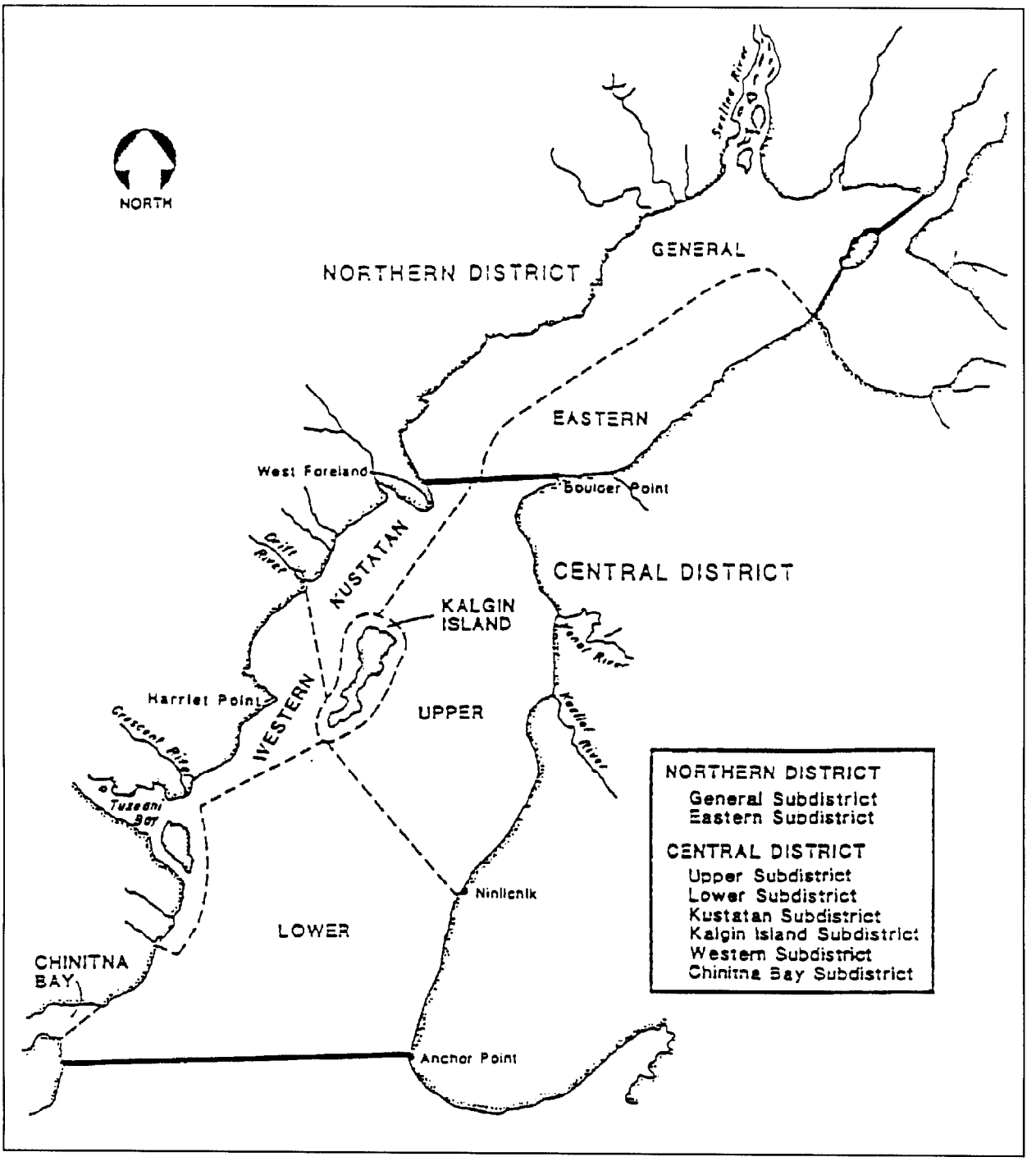
[b] May include harvest from West Cook Inlet waters.

Appendix A66.-West Cook Inlet drainage other fish (includes smelt, whitefish and northern pike prior to 1985) harvest by fishery, 1977-1994.

Year	Chuitna River	Theodore River	Lewis River	Other[a]	Total
1977	12	0	0		12
1978	0	0	0		0
1979	45	0	0		45
1980	0	0	0		0
1981	0	0			0
1982	0	0			0
1983	10	0			10
1984	0	0			0
1985	0	0	0		0
1986	0	0			0
1987	0	0	0		0
1988	0	0	0		0
1989	0	0	0		0
1990	0	0	0		0
1991	0	0	0		0
1992	0	0	0		0
1993	0	0	0	29	29
1994	0	0		9	9
Mean	4	0	0	19	6

[a] Includes lakes and streams.

APPENDIX B



Appendix B1.-Map of Upper Cook Inlet commercial salmon fishing districts.

Appendix B2.-Commercial salmon catch from all Upper Cook Inlet districts, 1977-1995.

Date	Chinook	Sockeye	Coho	Pink	Chum	All
1977	14,792	2,052,511	192,599	553,855	1,233,722	4,047,479
1978	17,302	2,621,667	219,360	1,689,098	571,959	5,119,386
1979	13,738	924,415	265,166	72,982	650,357	1,926,658
1980	13,795	1,573,637	271,378	1,786,430	390,810	4,036,050
1981	12,240	1,439,235	485,148	127,169	833,549	2,897,341
1982	20,870	3,259,864	793,937	790,648	1,433,866	6,299,185
1983	20,634	5,049,733	516,322	70,327	1,114,858	6,771,874
1984	8,819	2,102,767	442,619	622,510	684,124	3,860,839
1985	23,297	3,852,141	619,924	83,538	714,140	5,293,040
1986	39,240	4,787,982	756,830	1,299,360	1,134,173	8,017,585
1987	39,661	9,500,186	451,404	109,801	349,132	10,450,184
1988	29,060	6,834,342	560,022	469,972	708,573	8,601,969
1989	26,742	5,010,698	339,201	67,430	122,027	5,566,098
1990	16,105	3,604,064	500,026	603,630	351,197	5,075,022
1991	13,535	2,177,576	425,724	14,663	280,223	2,911,721
1992	16,722	8,901,566	462,565	677,346	350,914	10,409,113
1993	18,841	4,754,846	306,845	100,934	122,767	5,304,233
1994	20,260	3,567,392	580,567	520,481	299,300	4,988,000
1995	17,857	2,951,827	446,954	133,575	529,422	4,079,635
Mean	20,185	3,945,603	454,557	515,460	625,006	5,560,811

Appendix B3.-Upper Cook Inlet commercial salmon catch from the Central District drift net fishery, 1977-1995.

Date	Chinook	Sockeye	Coho	Pink	Chum	All
1977	3,381	1,072,066	106,284	285,943	1,118,861	2,586,535
1978	2,009	1,801,600	67,775	933,049	474,633	3,279,066
1979	1,032	453,692	106,696	19,379	601,404	1,182,203
1980	837	769,078	88,792	963,133	327,506	2,149,346
1981	2,317	632,756	221,923	53,795	752,764	1,663,555
1982	1,232	2,102,307	398,958	270,122	1,340,789	4,113,408
1983	1,115	3,221,783	318,208	26,603	1,040,170	4,607,879
1984	505	1,228,252	195,230	279,608	563,187	2,266,782
1985	1,912	1,890,388	314,795	33,986	643,425	2,884,506
1986	1,826	2,834,170	501,059	614,384	1,009,591	4,961,030
1987	4,551	5,631,691	195,937	38,587	208,014	6,078,780
1988	2,216	4,129,686	263,701	226,456	575,441	5,197,500
1990	620	2,305,707	245,223	323,936	289,302	3,164,788
1991	241	1,117,514	175,504	5,791	215,469	1,514,519
1992	662	5,942,970	263,888	413,588	310,963	6,932,071
1993	769	2,561,451	122,155	46,510	88,994	2,819,879
1994	460	1,878,463	306,217	251,602	245,854	2,682,596
1995	594	1,773,873	241,473	64,632	468,224	2,548,796
Mean	1,460	2,297,080	229,657	269,506	570,810	3,368,513

Appendix B4.-Upper Cook Inlet commercial salmon catch from the Central District western set net fishery, 1977-1995.

Date	Chinook	Sockeye	Coho	Pink	Chum	All
1977	727	200,175	18,721	22,076	96,460	338,159
1978	1,368	164,975	33,881	20,619	50,758	271,601
1979	1,799	111,124	36,329	1,665	72,877	223,794
1980	1,463	143,118	27,600	33,750	34,349	240,280
1981	748	93,036	46,478	4,636	89,676	234,574
1982	1,852	235,208	102,716	8,255	98,459	446,490
1983	1,938	215,566	50,797	1,050	56,161	325,512
1984	1,108	556,300	93,962	55,293	145,645	852,308
1985	2,040	595,122	134,770	9,122	130,096	871,150
1986	1,417	396,175	87,755	51,323	115,800	652,470
1987	424	651,037	51,017	7,640	42,146	752,264
1988	664	298,252	39,626	14,086	45,656	398,284
1989	1,272	55,856	23,342	1,899	17,797	100,166
1990	620	137,425	37,368	16,549	26,596	218,558
1991	552	17,195	19,361	168	4,455	40,731
1992	217	23,143	15,767	612	5,209	44,948
1993	223	23,930	9,195	941	3,433	37,722
1994	203	13,124	20,153	362	2,930	36,772
1995	859	19,444	22,821	949	2,662	30,899
Mean	1,026	207,786	45,215	13,201	54,756	321,931

Appendix B5.-Upper Cook Inlet commercial salmon catch from all northern districts (East and General [west] subdistricts), 1977-1995.

Date	Chinook	Sockeye	Coho	Pink	Chum	All
1977	565	123,780	20,623	116,518	23,861	285,347
1978	666	51,624	47,256	327,270	37,331	464,150
1979	1,714	112,449	52,635	26,332	9,270	202,400
1980	993	105,647	90,098	474,488	16,728	687,951
1981	725	249,662	134,362	53,325	46,208	484,282
1982	2,716	118,060	85,352	73,307	43,006	322,441
1983	933	184,219	53,867	21,604	29,321	289,944
1984	1,004	210,947	110,218	103,941	75,846	501,837
1985	1,890	163,012	79,245	26,511	31,213	301,844
1986	15,488	141,830	88,108	139,002	76,040	460,468
1987	12,701	164,602	98,920	18,205	67,180	361,608
1988	12,836	129,713	149,742	54,210	75,728	422,229
1989	12,731	280,801	175,710	23,878	81,948	575,068
1990	9,582	96,398	139,401	43,944	35,710	325,035
1991	6,859	116,201	132,270	5,153	39,393	299,876
1992	4,554	69,257	85,486	23,712	24,329	207,361
1993	3,277	146,319	106,258	10,468	25,401	291,723
1994	3,185	120,142	144,064	29,181	40,059	336,631
1995	4,130	109,096	89,300	11,713	43,667	257,908
Mean	5,082	141,777	99,101	83,303	43,276	372,532

Appendix B6.-Upper Cook Inlet commercial salmon catch from the Northern District General (west) Subdistrict, 1977-1995.

Date	Chinook	Sockeye	Coho	Pink	Chum	All
1977	511	88,729	15,892	102,679	22,252	230,063
1978	388	33,326	35,313	302,529	35,835	407,391
1979	1,418	51,537	34,943	22,627	8,717	119,242
1980	741	60,799	78,345	446,388	14,183	600,456
1981	634	148,806	118,792	45,951	41,789	355,972
1982	2,003	66,940	63,712	66,112	31,850	230,617
1983	841	117,015	42,089	20,749	26,556	207,250
1984	784	136,596	86,813	83,112	67,054	374,359
1985	1,461	95,412	56,751	23,847	27,221	204,692
1986	13,462	94,849	68,994	118,537	67,426	363,268
1987	10,775	97,089	64,082	13,215	53,159	238,320
1988	11,592	98,289	123,356	46,441	70,136	349,814
1989	10,333	201,268	133,952	20,731	64,042	430,326
1990	7,094	69,386	107,300	35,491	31,833	251,104
1991	5,750	81,909	104,896	4,223	34,862	231,640
1992	3,792	54,625	65,434	17,005	23,423	164,279
1993	2,774	119,718	87,191	9,164	23,873	242,720
1994	2,779	90,808	114,759	25,672	36,636	270,654
1995	3,282	85,865	77,312	8,764	41,282	216,525
Mean	4,232	94,367	77,891	74,381	38,007	288,879

Appendix B7.-Upper Cook Inlet commercial salmon catch from Northern District, Eastern Subdistrict, 1977-1995.

Date	Chinook	Sockeye	Coho	Pink	Chum	All
1977	54	35,051	4,731	13,839	1,609	55,284
1978	278	18,293	11,943	24,741	1,493	56,748
1979	296	60,912	17,692	3,705	553	83,158
1980	245	44,077	11,110	26,609	2,397	84,438
1981	91	100,856	15,570	7,374	4,419	128,310
1982	713	51,120	21,640	7,195	11,156	91,824
1983	92	67,204	11,778	855	2,765	82,694
1984	101	74,351	23,405	20,829	8,792	127,478
1985	402	67,600	22,494	2,664	3,992	97,152
1986	2,026	46,981	19,114	20,465	8,614	97,200
1987	1,926	67,513	34,838	4,990	14,021	123,288
1988	1,244	31,424	26,386	7,769	5,592	72,415
1989	2,398	79,533	41,758	3,147	17,906	144,742
1990	2,488	27,012	32,101	8,453	3,877	73,931
1991	1,109	34,292	27,374	930	4,531	68,236
1992	785	14,632	20,052	6,707	906	43,082
1993	503	26,601	19,067	1,304	1,528	49,003
1994	406	29,334	29,305	3,509	3,423	65,977
1995	848	23,233	11,988	2,929	2,385	41,383
Mean	842	47,369	21,176	8,843	5,261	83,492

Appendix B8.-Northern District commercial chinook salmon harvest by period, Cook Inlet, 1986-1995.

Year	Period[a] 1	2	3	4	Directed Chinook Salmon Total	NCI Season Total	Upper Cook Inlet Season Total
1986	3,842	5,218	4,711	---	13,771	15,488	39,240
1987	3,365	3,397	3,754	1,025	11,541	12,701	39,661
1988	3,511	3,676	3,935	---	11,122	12,836	29,060
1989	4,148	4,935	1,985	---	11,068	12,731	26,742
1990	2,928	3,041	2,103	---	8,072	9,585	16,105
1991	2,854	1,688	1,431	322	6,305	6,859	13,535
1992	911	2,191	816	---	3,918	4,554	16,722
1993	1,191	1,735	116	---	3,042	3,277	18,841
1994	1,680	1,326	---	---	3,058	3,185	20,260
1995	3,837	---	---	---	3,837	4,130	17,857
Mean	2,827	3,023	2,095	678	7,573	8,535	23,802

[a] Fishing periods established by Northern District King Salmon Management Plan (5 AAC 21.366). The season occurs on Mondays 1-24 June, 7:00 a.m. to 1:00 p.m. and is closed when the 12,500 king salmon quota is achieved or to address conservation concerns.

Appendix B9.-Knik Arm commercial set gillnet harvest, 1987-1995.

Year	Chinook Salmon	Sockeye Salmon	Coho Salmon	Pink Salmon	Chum Salmon	Total
1987	[a]	24,090	2,043	264	403	26,800
1988	9	38,251	11,604	591	2,733	53,188
1989	4	47,925	6,075	545	4,979	59,528
1990	4	23,450	5,708	696	5,308	35,166
1991	[a]	10,459	1,630	21	961	13,071
1992	[a]	10,748	1,817	573	1,289	14,427
1993	[a]	47,751	831	29	990	49,601
1994	0	7,528	809	141	357	8,835
1995	5	19,477	1,999	72	1,018	22,571
Mean	6	25,520	3,613	326	2,004	31,465

[a] Not reported.

APPENDIX C

Appendix C1.-Number of fish (actual and planned) stocked into Northern Cook Inlet Management Area waters, 1993-1996.

Species/Life Stage/Site	1993 (Actual)	1994 (Actual)	1995 (Actual)	1996 (Planned)
Chinook Salmon Anadromous Smolt				
Willow Creek	160,094	177,913	184,740	200,000
Total	160,094	177,913	184,740	200,000
Coho Salmon Anadromous Smolt				
Wasilla Creek Drainage	77,174	0	0	0
Cottonwood Creek Drainage	74,198	0	0	0
Little Susitna River Drainage	279,873	126,694	151,985	0
Big Lake Drainage	67,934	0	0	0
Eklutna Tailrace (Knik River)	108,000	62,400	69,867	70,000
Total	607,179	189,094	221,852	70,000
Coho Salmon Landlocked Fingerlings				
Barley Lake	1,860	1,860	1,860	1,860
Bear Paw Lake	9,000	9,000	4,500	4,500
Benka	12,230	12,300	0	0
Carpenter Lake	17,560	17,560	17,600	17,640
Christiansen Lake	35,804	35,804	17,900	17,900
Diamond Lake	13,900	13,900	13,900	13,900
Echo Lake	4,600	4,600	2,300	2,300
Finger Lake	12,938	0	0	0
Johnson Lake	0	7,431	0	0
Kalmbach Lake	12,492	12,500	12,500	12,500
Klaire Lake	1,800	0	900	900
Knik Lake	5,000	5,000	5,000	5,000
Loberg (Junction) Lake	1,100	1,100	1,100	1,100
Matanuska Lake	6,200	6,200	0	0
Memory Lake	15,966	16,600	8,300	8,300
Prator Lake	19,905	19,600	9,800	9,800
Rocky Lake	6,062	5,900	2,900	2,900
Victor Lake	5,400	2,700	2,700	2,700
Total	181,817	172,595	101,260	101,300
Chinook Salmon Landlocked Subcatchables				
Finger Lake	36,141	35,980	35,954	36,000
Total	36,141	35,980	39,954	36,000

-continued-

Appendix C1.-Page 2 of 5.

Species/Life Stage/Site	1993 (Actual)	1994 (Actual)	1995 (Actual)	1996 (Planned)
Rainbow Trout Landlocked Catchables				
Coyote Lake	323	304	300	300
Echo Lake	1,816	2,375	2,405	2,300
Irene Lake	1,473	1,799	1,914	1,800
Kepler/Bradley Lake	4,619	7,291	8,495	5,800
Knik Lake	1,998	2,467	2,474	2,500
Loberg (Junction) Lake	880	1,134	1,100	1,100
Long (Mile 86) Lake	0	0	3,731	3,720
Matanuska Lake	7,349	9,538	11,866	9,200
Rocky Lake	0	0	0	2,900
Slipper (Eska) Lake	477	726	900	900
South Rolly	0	0	0	5,400
Tanaina Lake	0	0	0	5,450
Walby	2,083	2,688	2,572	2,700
Weiner	0	0	0	1,050
Total	21,267	28,529	35,706	44,720
Rainbow Trout Landlocked Fingerlings				
Barley Lake	1,860	1,860	1,482	1,860
Bear Paw Lake	4,500	0	4,500	0
Bench Lake	3,440	0	3,439	0
Beverly Lake	0	4,200	0	4,200
Big Beaver Lake	16,100	0	0	0
Big No Luck Lake	6,807	6,925	5,519	6,800
Blodgett Lake	5,760	0	0	0
Carpenter Lake	17,900	17,640	17,991	17,640
Christiansen	17,900	0	17,900	0
Crystal Lake	13,170	13,178	13,170	13,170
Dawn Lake	2,360	2,360	2,360	2,360
Diamond Lake	11,900	10,900	13,964	13,900
Dollar Lake	1,388	0	0	0
Farmer Lake	1,100	1,100	1,128	1,100
Finger Lake	36,200	46,232	36,119	36,200
Florence Lake	5,460	10,910	5,460	5,460
Homestead Lake	3,588	0	3,400	1,700
Honeybee Lake	5,800	5,800	5,950	5,800
Ida Lake	0	5,800	4,842	4,640
Johnson Lake	7,869	0	0	0
Kalmbach Lake	12,500	12,631	12,527	12,500

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Appendix C1.-Page 3 of 5.

Species/Life Stage/Site	1993 (Actual)	1994 (Actual)	1995 (Actual)	1996 (Planned)
Rainbow Trout Landlocked Fingerlings, cont.				
Kashwitna Lake	16,000	16,000	16,000	16,000
Kepler/Bradley Lake	5,800	5,812	5,700	5,800
Knik Lake	2,500	2,500	0	2,500
Lalen Lake	4,500	9,191	9,387	9,191
Lazy Lake	2,529	0	0	0
Little Lonely Lake	5,600	5,844	0	5,600
Long Lake (K/B)	14,738	7,439	8,340	7,440
Long Lake (Big Lake)	4,658	0	0	0
Long Lake (Mi. 86 Glenn)	10,600	10,600	11,295	0
Loon Lake	10,800	10,800	10,800	10,800
Lorraine Lake	13,200	13,200	13,235	13,200
Lucille Lake	71,800	72,386	72,627	36,200
Lynda Lake	1,241	0	0	0
Lynne Lake	7,000	7,000	7,000	7,000
Marion Lake	11,300	11,300	11,274	11,300
Matanuska Lake	3,100	3,218	0	0
Memory Lake	8,300	0	8,123	0
Morvro Lake	8,676	8,636	0	8,660
North Friend Lake	8,140	8,140	8,140	8,140
Prator Lake	9,800	0	9,800	0
Ravine Lake	2,500	2,500	2,632	2,500
Reed Lake	1,950	2,012	2,700	1,950
Rocky Lake	5,870	6,875	0	0
Ruby Lake	4,945	0	0	4,800
Seventeenmile Lake	10,000	10,000	10,526	10,000
Seymour Lake	11,500	22,897	27,571	22,900
South Friend Lake	5,570	5,570	5,570	5,570
South Rolly Lake	21,596	21,540	21,540	0
Stepan Lake	5,694	0	0	0
Tigger Lake	1,890	1,890	1,946	1,890
Twin Lake	6,094	6,250	0	0
Twin Island Lake	0	15,074	15,089	15,100
Vera Lake	11,050	11,121	11,050	11,050
Visnaw Lake	6,559	13,090	13,196	13,070
Walby Lake	10,780	10,780	5,390	5,390
Weiner Lake	0	4,142	4,258	4,140

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Species/Life Stage/Site	1993 (Actual)	1994 (Actual)	1995 (Actual)	1996 (Planned)
Rainbow Trout Landlocked Fingerlings, cont.				
West Beaver Lake	11,500	0	0	0
West Sunshine Lake	4,460	0	2,230	0
Willow Lake	14,300	14,803	14,300	14,300
Wishbone Lake	5,271	5,307	2,738	2,635
Wolf Lake	0	12,407	12,400	12,400
"X" Lake	19,949	10,220	5,055	5,055
"Y" Lake	3,970	3,985	3,970	3,970
Total	573,223	505,825	503,633	401,361
Arctic Grayling Landlocked Fingerlings				
Bruce Lake	0	2,700	0	2,700
Canoe Lake	4,200	4,200	4,200	4,200
Farmer Lake	1,100	1,100	0	0
Finger Lake	18,100	1,800	18,100	18,100
Florence Lake	5,460	5,460	5,460	5,460
Kepler/Bradley Lake	5,800	5,800	5,800	5,800
Knik Lake	5,000	2,500	2,500	2,500
Loberg (Junction) Lake	1,100	1,100	0	0
Long [Mile 86] Lake	10,600	10,600	10,600	10,600
Lorraine Lake	13,200	13,200	13,200	13,200
Matanuska Lake	3,100	3,200	0	0
Meirs Lake	3,400	10,000	3,400	3,400
Reed Lake	1,950	1,950	1,950	1,950
Seventeenmile Lake	10,000	10,000	10,000	10,000
"Y" Lake	3,900	3,900	3,900	3,900
Total	86,910	77,510	79,110	81,810
Arctic Grayling Landlocked Fry				
Long Lake (Mile 86)	64,000	64,000	0	0
Meirs Lake	16,700	16,700	0	0
Canoe Lake	21,200	21,200	0	0
Total	101,900	101,900	0	0

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Species/Life Stage/Site	1993 (Actual)	1994 (Actual)	1995 (Actual)	1996 (Planned)
Arctic Char Landlocked Fingerlings				
Benka Lake	12,300	12,300	12,300	12,300
Finger Lake	36,200	36,200	3,200	36,200
Irene Lake	3,600	3,600	1,800	1,800
Lynne Lake	7,000	7,000	7,000	7,000
Marion Lake	11,300	11,300	0	11,300
Matanuska	0	0	0	3,100
Total	70,400	70,400	24,300	71,700
Lake Trout Landlocked Fingerlings				
Long Lake (Mile 86)	0	10,600	0	10,600
Total	0	10,600	0	10,600
Total Anadromous Stockings	767,373	367,007	406,592	270,000
Total Landlocked Stockings	1,053,758	1,027,896	780,014	747,891
Total Stockings	1,821,131	1,394,903	1,186,606	1,017,891

APPENDIX D

Appendix D1.-Emergency orders issued for NCIMA waters during 1991-1995.

Emergency Orders issued in 1991:

1. E. O. No. 2-KS-2-03-91 reduced bag and possession limits within the Chuitna (Chuit), Theodore, Lewis, and Beluga River drainages to 1 king salmon 16 inches or more in length. Effective from May 25 through July 13, 1991.
2. E. O. No. 2-KS-2-16-91 closed the Lewis and Theodore drainages to king salmon fishing, and additionally closed the Chuit River drainage upstream from the Tyonek Road crossing to king salmon fishing. Effective June 25 through July 13, 1991.
3. E. O. No. 2-KS-2-21-91 superseded E. O. 2-KS-2-16-91 and closed Lewis, Theodore and Chuit rivers in their entirety to king salmon fishing. Effective July 4 through July 13, 1991.
4. E. O. No. 2-KS-2-22-91 opened all waters within one-fourth mile radius of Willow Creek's confluence with the Susitna River to fishing for king salmon. Effective July 6 and July 7, 1991.
5. E. O. No. 2-SS-2-27-91 closed to fishing that portion of the Little Susitna River from the fish counting weir located at river mile 32.5 downstream for a distance of 1,500 feet. Effective July 27 through September 14, 1991.
6. E. O. No. 2-RS-1-29-91 closed sockeye salmon fishing in all waters north of the latitude of Anchor Point. Effective 7:00 a.m. July 26 through December 31, 1991.
7. E. O. No. 2-RS-2-33-91 opened the Fish Creek personal use dip net fishery. Effective July 30 through August 9, 1991.
8. E. O. No. 2-RS-2-34-91 reopened the Little Susitna River drainage and all freshwater drainages of Knik Arm to fishing for sockeye salmon. Effective noon, July 29 through December 31, 1991.
9. E. O. No. 2-RS-2-36-91 rescinded E. O. No. 2-RS-1-29-91, thereby reopening recreational sockeye salmon fisheries within waters of the Kenai Peninsula and Susitna-West Cook Inlet regulatory areas and marine waters of Cook Inlet north of Anchor Point. Effective 7:00 a.m. August 2 through December 31, 1991.
10. E. O. No. 2-CS-2-38-91 closed the Eklutna Power Plant tailrace to sport fishing from the Old Glenn Highway downstream to department markers placed approximately 100 yards upstream of the confluence of the tailrace and the Knik River. Effective noon, August 6 through December 31, 1991.
11. E. O. No. 2-SS-2-42-91 increased bag and possession limits to 5 coho salmon at the Little Susitna River downstream from the department's salmon counting weir at river mile 32.5. Effective noon, August 14 through December 31, 1991.
12. E. O. No. 2-BB-2-52-91 reduced the bag and possession limits for burbot from 15 per day and in possession to 5 per day and in possession and reduced gear to two closely attended lines while fishing through ice in the Big Lake drainage (Houston area). Effective December 1, 1991 until superseded by regulation or subsequent emergency order.

13. E. O. No. 2-BB-2-53-91 closed Nancy Lake (Mile 64 Parks Highway) to burbot fishing. Effective December 1, 1991 until superseded by regulation or subsequent emergency order.

Emergency Orders issued in 1992:

1. E. O. No. 2-KS-2-08-92 reduced the length of the king salmon season and reduced the daily bag and possession limit for king salmon to 1 fish greater than 16 inches in length in all waters draining into Cook Inlet between Cape Douglas and the Susitna River, excluding the Susitna River. Additionally this E. O. required the release of all king salmon 16 inches or more in length and the use of unbaited, artificial lures in all waters of the Chuitna River drainage upstream of a department marker located at the old cable crossing, and all waters of the Theodore River drainage upstream of a department marker located approximately 1 river mile upstream of the main Beluga haul road bridge. Effective May 26 through July 13, 1992.
2. E. O. No. 2-KS-2-12-92 clarified that Willow Creek is open to king salmon fishing on Saturday, Sunday and Monday for 3 consecutive weeks. Effective June 20 through June 22, 1992.
3. E. O. No. 20-KS-2-14-92 opened Willow Creek from its mouth upstream to the Parks Highway bridge and all waters within a one-quarter mile radius of Willow Creek's confluence with the Susitna River to king salmon fishing. Effective June 23 through June 26, 1992.
4. E. O. No. 2-KS-2-15-92 reduced the daily bag limit for king salmon, 16 inches or more in length, to 1 fish in all waters of the Susitna and Little Susitna River drainages. It further required the release of all king salmon, 16 inches or more in length, and the use of unbaited artificial lures in all waters of the Deshka River drainage between the Deshka River's confluence with Trapper Creek and the confluence of Moose and Kroto creeks (The Forks); and in all waters of the Alexander Creek drainage upstream from Alexander Creek's confluence with Trail Creek. Effective June 22 through July 13, 1992.
5. E. O. No. 2-RS-2-21-92 opened the Fish Creek personal use dip net fishery. Dip net fishing was allowed for 3 consecutive days followed by a 1 day closure on a continuing basis. Effective 6:00 a.m. July 23 through August 6, 1992.
6. E. O. No. 2-SS-2-22-92 closed to fishing that portion of the Little Susitna River from the fish counting weir located at river mile 33 downstream for a distance of 1,500 feet. Effective July 25 through September 14, 1992.
7. E. O. No. 2-RS-2-28-92 closed the Susitna River drainage to sockeye salmon fishing. Effective July 31 through December 31, 1992.
8. E. O. No. 2-SS-2-29-92 increased bag and possession limits to 5 coho salmon 16 inches or more in length downstream from the department's counting weir at river mile 32.5. Effective August 15 through December 31, 1992.

Emergency Orders issued in 1993:

1. E. O. No. 2-RS-2-23-93 opened the Fish Creek personal use fishery. The dip net fishery opened 9:00 a.m. July 24 and closed midnight August 6, with the fishery being closed July 26, July 30, and August 3, 1993.
2. E. O. No. 2-SS-2-25-93 closed to fishing that portion of the Little Susitna River from the fish counting weir located at river mile 33 downstream for a distance of 1,500 feet. Effective July 23 through September 15, 1993.
3. E. O. No. 2-SS-2-32-93 increased the bag and possession limits to 5 coho salmon at the Little Susitna River downstream from the department's counting weir at river mile 32.5. Effective August 11 through December 31, 1993.
4. E. O. No. 2-SS-2-33-93 closed to fishing that portion of Jim Creek from the fish counting weir located at river mile 1 downstream for a distance of 500 feet. Effective August 12 through November 1, 1993.

Emergency Orders issued in 1994:

1. E. O. No. 2-RS-2-28-94 opened the Fish Creek personal use fishery. The dip net fishery opened 9:00 a.m. July 27 and closed midnight August 5, with the fishery being closed July 29 and August 2, 1994.
2. E. O. No 2-RS-2-33-94 supersedes E.O. 2-RS-2-28-94 extending the Fish Creek Personal Use Dip Net Fishery through midnight August 9. Effective August 7, 1994 through August 9, 1994.
3. E. O. No. 2-KS-2-05-94 closed to fishing that portion of the Little Susitna River from the fish counting weir located at river mile 33 downstream for a distance of 1,500 feet. Effective May 25 through September 15, 1994.
4. E. O. No. 2-SS-2-32-94 increased the bag and possession limits to 5 coho salmon at the Little Susitna River downstream from the department's counting weir at river mile 32.5. Effective August 6 through December 31, 1994.
5. E. O. No. 2-SS-2-29-94 closed that portion of Jim Creek to fishing from the fish counting weir located at river mile 1 downstream for a distance of 1,000 feet. Effective July 26, 1994 through November 1, 1994.
6. E. O. No. 2-KS-2-02-94 reduced the chinook salmon possession limit to 1 fish and eliminated the use of bait in the Deshka River. Effective May 1, 1994 through July 13, 1994.
7. E. O. No. 2-KS-2-13-94 closed all waters of the Deshka River drainage to sport fishing for chinook salmon and prohibited the use of bait in the following waters of the Susitna River drainage: (1) all waters of the Susitna River drainage downstream of the Deshka River which flow into the Susitna River from the east and the Alexander Creek drainage, (2) all waters of the Yentna River drainage, (3) all waters of the Talkeetna River drainage, and (4) all waters of the Chulitna River drainage. Effective June 17, 1994 through July 13, 1994.

Emergency Orders issued in 1995:

1. E. O. No. 2-KS-2-07-95 closed to fishing that portion of the Little Susitna River from the fish counting weir located at river mile 33 downstream for a distance of 1,900 feet. Effective May 25 through September 15, 1995.
2. E.O. No. 2-KS-2-08-95 established a possession limit of 1 king salmon 16 inches or more in length in the Little Susitna River. Effective May 24 through September 15, 1995.
3. E.O. No. 2-KS-2-21-95 opened Willow Creek from its mouth upstream to the Parks Highway bridge and all waters within a one-quarter mile radius of Willow Creek's confluence with the Susitna River to king salmon fishing effective 12:01 a.m., Tuesday, July 4 through midnight Tuesday, July 4.
4. E. O. No. 2-RS-02-32-95 opened the Fish Creek personal use fishery. The dip net fishery opened 5:00 a.m. July 26 and closed midnight August 8, with the fishery being closed July 28 and August 1 and August 4, 1995.
5. E. O. No. 2-SS-02-40-95 increased the bag and possession limits to 5 coho salmon at the Little Susitna River downstream from the department's counting weir at river mile 32.5. Effective August 9 through December 31, 1995.

APPENDIX E

Appendix E1.-Chinook salmon regulatory history for NCIMA waters.

Chinook salmon fishing in NCIMA waters was open from statehood through 1963. During 1964 through 1966 chinook salmon fishing in fresh water was closed. During 1967 through 1970 Alexander Creek, Clear Creek, Deshka River and Lake Creek were open in their entirety. This fishery operated over a 15-day season during the middle of June on a 250 fish, over 20 inches in length, harvest quota system. Achievement of the quota may have resulted in early season closure. A 1 fish per day 2 per season bag limit for fish over 20 inches in length was in place and a punch card was a requirement of participation in the fishery. In 1971 the harvest quota was eliminated. During 1971 and 1972, in addition to the 15-day season in Alexander Creek, Deshka River, and Lake Creek, a more restrictive fishery was allowed (few days) in Clear Creek and portions of the Little Susitna River, Ship Creek (Anchorage) and Willow Creek, however a punch card was still required. In 1973, the area chinook salmon fishery was closed to the harvest of chinook salmon 20 inches or larger in length and remained so through 1978.

Selected Susitna River streams were reopened to chinook salmon fishing in 1979 after being closed for several years because of low stock abundance. Cautious incremental expansion has characterized the area's chinook salmon fisheries since they reopened. From 1979 through 1982 chinook salmon fishing was permitted at Alexander Creek, Lake Creek and at the Deshka River from the fourth Saturday in May through July 6. These streams drain into the Susitna River from the west. Clear Creek, a tributary of the Talkeetna River, also had a similar chinook salmon season. In addition, three eastside tributaries of the Susitna River, Willow, Caswell and Montana creeks, were open on Saturdays and Sundays only for 4 consecutive weekends commencing on the second Saturday in June. Harvest quotas, ranging from 200 to 7,000 chinook salmon, governed these fisheries from 1979 through 1982. The Chuitna River, a coastal stream near Beluga, and the entire Yentna and Talkeetna River drainages were opened to chinook salmon fishing in 1983. The opening date for chinook salmon fisheries that provided continuous daily fishing was also changed to January 1.

In 1984 the remaining coastal streams near Beluga and all waters draining into the westside of the Susitna River downstream from the Deshka River were opened to chinook salmon fishing. In 1986, portions of five road accessible streams on the east side of the Susitna River opened to weekend-only fishing. These streams were Little Willow, Goose, Sunshine, Sheep and Birch creeks.

Expanded chinook salmon fishing opportunity continued in 1987 when Monday fishing was added to all former weekend-only fisheries that drain into the Susitna River from the east. Saturday through Monday fishing was also allowed on the Susitna River and all flowing waters within one-quarter mile of the Susitna River (excluding the Kashwitna River) between the Deshka and Talkeetna rivers. These "corridor" fisheries were open for 4 continuous "weekends" similar to the previously mentioned Saturday through Monday fisheries. Chinook salmon fishing was permitted for the first time on the Susitna River drainage upstream from the Susitna River's confluence with the Talkeetna River to Devil's Canyon but excluding the Chulitna River drainage. Unbaited, single-hook, artificial lures were mandatory in this area. The season extended from January 1 through July 13. The season for all Susitna River and coastal fisheries that formerly closed on July 6 was extended to July 13 in 1987.

In 1989, chinook salmon fishing was allowed within a one-quarter mile radius of the mouth of the Kashwitna River. That same year fishing was permitted daily at Willow Creek between January 1 and the third Monday in June and on Saturday through Monday for 2 consecutive weeks starting the fourth Saturday in June.

Bag and possession limits were 1 chinook salmon 20 inches or over in length in 1979. The following year bag and possession limits changed to 2 chinook salmon 20 inches or over in length but only 1 chinook salmon could be over 28 inches in length. In 1981 the bag limit was reduced to 1 chinook salmon 20 inches or more in length and in possession. This limit remained in effect through 1985. A 5 fish (20 inches or more in length) per year limit governed all Cook Inlet chinook salmon fisheries from 1979 through 1985. This limit applied collectively to Northern Cook Inlet fresh water, Cook Inlet salt water and the Kenai Peninsula.

In 1986, bag and possession limits for the western drainages of the Susitna River were changed to 2 chinook salmon, 16 inches or more in length daily and 4 in possession and remained so through 1992. Only 1 fish daily and 2 in possession could be over 28 inches. Similar limits also applied to the West Cook Inlet coastal fisheries. Bag and possession limits for eastern drainages of the Susitna River in 1986 were 1 chinook salmon, 16 inches or more in length, and 2 in possession. The seasonal limit was 5 chinook salmon 16 inches or more in length. Anglers were required to list their chinook salmon harvest on nontransferable harvest records from 1979 through 1988. The date and location of harvested chinook salmon were recorded. A $5 permit stamp was mandatory for chinook salmon fishing from 1980 through 1982. The harvest record and yearly limit was eliminated for all NCI chinook salmon fisheries in 1989.

During the November 1992 BOF meeting several regulations were changed in the Susitna West-Cook Inlet Management Area to be in effect for the 1993 season. A seasonal limit of 5 chinook salmon was established for all waters of Cook Inlet. Individuals or companies engaged in freshwater sport fish guiding were prohibited from participating or engaging in sport fishing while clients were present or within his or her control or responsibility during the chinook salmon season except when guiding a client subject to the Americans with Disabilities Act.

In effect for the 1993 season in the West Cook Inlet area the chinook salmon fishing season was reduced in length to end on June 30. The bag and possession limit was reduced in areas open to the retention of chinook salmon 16 inches or more in length to 1 daily and 1 in possession.

Additionally, in the following areas of West Cook Inlet only unbaited, artificial lures could be used and chinook salmon 16 inches or more in length could not be possessed or retained; all chinook salmon caught had to be released immediately: (1) Chuitna River Drainage: upstream of a department marker located adjacent to the old cable crossing; (2) Theodore River Drainage: upstream of a department marker located approximately 1 mile upstream of the Beluga/Anchorage high voltage power lines; and (3) Lewis River Drainage: upstream of a department marker located approximately 1 river mile upstream of the main Beluga haul road bridge.

Action during the November 1992 meeting also reduced the chinook salmon bag and possession limit in the Susitna River drainage including all flowing waters draining into the west side of the Susitna River downstream of and including the Deshka River. The bag and possession limit for chinook salmon over 16 inches was reduced to 1 daily and 2 in possession.

In addition to BOF action, legislative action during June of 1992 established provisions that prohibited resident or nonresident anglers from fishing in Alaska without a king salmon stamp beginning in 1993.

In anticipation of an inadequate return to the Deshka River, prior to the 1994 chinook season an E.O. was issued reducing the chinook salmon possession limit to one fish and eliminated the use of bait in the Deshka River May 1 through July 14. As the 1994 chinook season progressed it became apparent a weak return was occurring in the entire Susitna River drainage and particularly in the Deshka River. In response to this an E.O. was issued closing all waters of the Deshka River to sport fishing for chinook salmon and prohibiting the use of bait in all waters of the Susitna River drainage downstream of the Deshka River which flow into the Susitna River from the east and the Alexander Creek drainage, all water of the Yentna River drainage, all waters of the Talkeetna River drainage, and all waters of the Chulitna River drainage, June 17 through July 13, 1994.

The BOF during its October 1994 work session choose to delegate to the department the authority to change regulations for the 1995 fishing season. These regulation changes were as follows:

1. the Deshka River and Prairie Creek are closed to fishing for chinook salmon;
2. Alexander Creek above the confluence of Trail Creek is closed to fishing for chinook salmon;
3. the bag and possession limit in the Susitna River and Little Susitna River drainages has been reduced to 1 chinook salmon over 16 inches in length;
4. the use of bait throughout the NCIMA is prohibited (excluding the Anchorage Management Unit),
5. fishing in the NCIMA is allowed only between the hours of 6:00 a.m. and 11:00 p.m. May 15 through July 13. This time restriction will not apply to that portion of the Susitna River drainage currently opened to weekend-only fishing (e.g. between, but not including, the Deshka River and the Talkeetna River) and the Anchorage Management Unit, and
6. the first opening of the Northern District commercial chinook salmon fishery will occur by emergency order. Additional opening of this fishery will be dependent upon inseason indications of run strength.

APPENDIX F

Appendix F1.-Board of Fisheries regulatory changes made during the November 1992 and October 1994 meetings.

PARTIAL SUMMARY OF NEW SPORT, PERSONAL USE, AND SUBSISTENCE FISHING REGULATIONS ADOPTED BY THE BOARD OF FISHERIES FOR NCIMA

King Salmon - Beginning in 1993

Entire Area

A seasonal limit of 5 king salmon was established for all waters of Cook Inlet. Anglers harvesting a king salmon must immediately enter in ink on the back of their sport fishing license in the appropriate location, the waters fished, species harvested, and date the fish was harvested. Anglers without an annual sport fishing license (anglers younger than 16 years of age and Alaska residents at least 60 years of age) must obtain a king salmon harvest record card prior to king salmon fishing. On harvesting a king salmon they must mark the harvest card accordingly.

The Board also adopted as regulation a proposal which stated that an individual or company engaged in freshwater sport fish guiding may not participate or engage in sport fishing while clients are present or within his or her control or responsibility during the king salmon season, except when guiding a client subject to the Americans with Disabilities Act.

In addition to BOF action, during the first legislative session in June of 1992, legislators passed House Bill 596. This bill included provisions that prohibited resident or nonresident anglers from fishing for king salmon in Alaskan waters unless they have purchased the current year's king salmon tag and have it in possession. King salmon tags are valid from January 1 through December 31. Anglers must stick the tag on the back of their sport fishing license and validate it by signing their name across the tag. Anglers can purchase king salmon tags at the same time they buy their 1993 sport fishing license from their local vendor. There are five groups of resident anglers who are not required to purchase a king salmon tag: (1) blind anglers who qualify for a 25-cent license; (2) anglers under the age of 16; (3) anglers 60 years of age or older who have been a resident of the state for at least 1 year; (4) disabled veterans who are eligible for a free sport fishing license; and (5) anglers who qualify for a $5 sport fishing license. All nonresident anglers are required to purchase a tag if they are fishing for king salmon in Alaska.

King Salmon - West Cook Inlet Area

The king salmon fishing season was reduced in length to end on June 30. The bag and possession limit was reduced in areas open to the retention of king salmon 16 inches or more in length to 1 daily and 1 in possession.

In the following areas only unbaited, artificial lures may be used, and king salmon 16 inches or more in length may not be possessed or retained; all king salmon caught must be released immediately:

1. Chuitna River Drainage: upstream of a department marker located adjacent to the old cable crossing;
2. Theodore River Drainage: upstream of a department marker located approximately 1 mile upstream of the Beluga/Anchorage high voltage power lines; and
3. Lewis River Drainage: upstream of a department marker located approximately 1 river mile upstream of the main Beluga haul road bridge.

King Salmon - Susitna River Drainage

(including all flowing waters draining into the west side of

the Susitna River downstream of and including the Deshka River)

The bag and possession limit for king salmon over 16 inches was reduced to 1 daily and 2 in possession.

Coho Salmon - Little Susitna River

The management plan for the Little Susitna River was modified. Only unbaited artificial lures may be used in the Little Susitna River from July 15 through August 5. The bag and possession limit for coho salmon 16 inches or more in length during this time period was increased to 3 daily and in possession.

Rainbow Trout

In Big Lake the rainbow trout bag limit was reduced to 2 daily and in possession. In the upper Cook Inlet area only 1 rainbow trout per day and 2 per season may be over 20 inches in length.

Long, X, and Wishbone lakes are closed to sport fishing from November 1 through April 30.

The North Fork of the Kashwitna River was established as a special management area for rainbow trout. Only single-hook, unbaited, artificial lures may be used in the North Fork of the Kashwitna River and rainbow trout may not be possessed or retained; all rainbow trout caught must be released immediately.

Only unbaited artificial lures may be used in all flowing waters of the Susitna-West Cook Inlet area (except when fishing for burbot when using legal gear for burbot as described under burbot in the section) from September 1 through May 15, except in areas in which special regulations are in effect. Areas with special regulations in effect generally require the use of unbaited artificial lures year round and further stipulate that rainbow trout may not be possessed or retained.

In the Lake Creek drainage, rainbow trout may not be possessed or retained in all flowing waters from August 15 through May 15, upstream from a department marker located approximately 100 yards upstream from its confluence with the Yentna River to a department marker located approximately one-quarter mile upstream from Bulchitna Lake. Only single-hook unbaited artificial lures may be used in this area during this time period. The Lake Creek drainage upstream from the Bulchitna Lake marker continues to be managed as a catch-and-release area for rainbow trout.

Burbot

In the Susitna-West Cook Inlet area set lines are prohibited. Burbot may be taken with more than one line and hook if: (1) the total number of aggregate hooks does not exceed the daily bag limit for waters being fished; (2) the hooks are single hooks with a gap between point and shank larger than three-quarters of an inch; (3) each hook is set to sit on the bottom of the lake or stream; and (4) the burbot gear is closely attended.

The daily bag and possession limit for burbot is 5 daily and in possession in all waters of Susitna-West Cook Inlet Area.

Nancy Lake is closed to the harvest of burbot.

Lake Trout

The bag and possession limit for lake trout is 2 daily and in possession in all waters of Susitna-West Cook Inlet.

Three Mile Creek

Three Mile Creek in the West Cook Inlet area-that portion of Three Mile Creek from the road crossing upstream to Three Mile Lake and including that portion of Three Mile lake within a 300 foot radius of the outlet is closed to all fishing.

Fish Creek Personal Use

Changes in the Cook Inlet Personal Use Salmon Dip Net Fishery Management Plan pertaining to the Fish Creek dip net fishery are as follows:

1. the fishery will be opened by E.O. after July 23 on Saturdays, Sundays, and Wednesdays to the taking of sockeye and coho salmon provided the spawning escapement of sockeye salmon into Big Lake drainage is projected to exceed 50,000 fish;
2. additional fishing time can be established by E.O. provided that no more than 3 consecutive days of fishing is allowed without a minimum of 1 day of closure if escapement into Fish Creek warrants such action;

3. the area to be open to harvesting salmon by dip net includes waters upstream from a department marker located at the mouth of Fish Creek to a department marker located approximately one-quarter mile upstream of the Knik-Goose Bay Road;
4. the daily bag and possession limit is 6 salmon not in addition to the daily sport fish bag and possession limit;
5. the fishery shall close the second Friday in August, or earlier by E.O. if the harvest of coho becomes excessive in department opinion.

Subsistence

In December of 1992 the BOF found that most of Cook Inlet was a nonsubsistence zone and repealed the Upper Cook Inlet Subsistence Management Plan thus eliminating the subsistence fishery in Upper Cook Inlet. The only area that remained open to subsistence fishing in the Upper Cook Inlet area was the Tyonek subdistrict of the Northern District on the west side of Cook Inlet. A court ruling in November of 1993 which found this action by the BOF to be unconstitutional again allowed a subsistence fishery in Upper Cook Inlet for the 1994 season.

King Salmon - Beginning in 1995

Entire Area

During their October 1994 meeting in Fairbanks the BOF delegated authority to restrict chinook salmon harvests in Northern Cook Inlet to the Commissioner of the ADF&G to address stock conservation concerns. The following regulations will be in effect for the 1995 chinook salmon season:

1. the Deshka River and Prairie Creek are closed to fishing for chinook salmon;
2. Alexander Creek above the confluence of Trail Creek is closed to fishing for chinook salmon;
3. the bag and possession limit in the Susitna River and Little Susitna River drainages has been reduced to 1 chinook salmon over 16 inches in length;
4. the use of bait throughout the NCIMA is prohibited,
5. fishing in the NCIMA is allowed only between the hours of 6:00 a.m. and 11:00 p.m. May 15 through July 13. This time restriction will not apply to that portion of the Susitna River drainage currently opened to weekend-only fishing (e.g. between, but not including, the Deshka River and the Talkeetna River), and
6. by emergency order only the first opening of the Northern District commercial chinook salmon fishery will occur. Additional opening of this fishery will be dependent upon inseason indications of run strength.

APPENDIX G

Appendix G1.-Confirmed and reported northern pike waters in the Northern Cook Inlet Management Area.

Susitna Basin Lakes

Alexander Creek
Alexander Lake
Sucker Lake
Trail Lake
Rabbit Lake
Lower Susitna
Flathorn Lake
Figure 8 Lake
Mid Susitna
Witsoe Lake
Witsol Lake
Lockwood Lake
Lady Slipper
Unnamed
Unnamed
Unnamed
Vern Lake
Ding Dong
Yentna River
Whiskey Lake
Bulchitna Lake
Fish Creek Lake 1
Fish Creek Lake 2
Fish Creek Lake 3
Fish Creek Lake 4
Donkey Lake
Hewitt Lake
No Name (Big Bend)
Chelatna Lake
Skwentna River
Eight Mile Lake
Seven Mile Lake
No Name (Herk Strip)
One Stone Lake
Deshka River
Parker Lake
Trapper Lake
No Name Lake
Ambler Lake
Rocky Lake
Neil Lake
Kroto Lake
Upper Susitna
Kashwitna Lake*
Caswell Lake*
Fish Lake*
Sawmill Lake*
Swan Lake
Nancy Lake Area
Redshirt Lake
Lynx Lake
Cow Lake
Little Chicken
South Rolly Lake
North Rolly Lake
Tanaina Lake
Milo Lake
Frazer Lake
Little Frazer Lake
James Lake
Owl Lake
Char Lake
Ardaw Lake
Phoebe Lake
Chicken Lake
Echo Pond #1
Echo Pond #2
Echo Pond #3
Candle Stick Lake
Bains Pond #1
Bains Pond #2
Bains Pond #3

Susitna Tributaries

Deshka River
Fish Creek (Flathorn)
Fish Creek (Kroto)
Lake Creek
Fish Lake Creek
Alexander Creek
Trappers Creek
Sucker Creek
Montana Creek
Rolly Creek
Moose Creek
Bottle Creek
Hewitt Creek
Donkey Creek
Indian Creek (Yentna)
Indian (Chulitna)*
Rabideux Creek
Fish Lake Creek
Kutna Creek (Yentna)
Shell Creek
Eightmile Creel
Caswell Creek
Witsoe Creek
Trapper (Talkeetna)*
Talachulitna Creek*
Johnson Creek
Otter Creek
Unnamed (Low Su)
Sunshine Creek*
Anderson Creek*
Wiggel Creek*
Birch Creek*
Yentna River
Skwentna River
Chulitna River*
Little Susitna River*

Knik River Basin

Swan Lake*

West Cook Inlet

Chuit River
Threemile Creek
Chuit Lake
Threemile Lake

* Reported but not confirmed northern pike populations (D. Rutz, Alaska Department of Fish and Game, personal communication)